Conformity Determination of the 2004 Baltimore Regional Transportation Plan and the FY 2006-2010 Transportation Improvement Program: *Fine Particulate Matter*

Prepared by the Baltimore Regional Transportation Board,
the Metropolitan Planning Organization
for the Baltimore Region

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CONFORMITY DETERMINATION OF THE 2004 BALTIMORE REGIONAL TRANSPORTATION PLAN AND THE FY 2006-2010 TRANSPORTATION IMPROVEMENT PROGRAM: *FINE PARTICULATE MATTER*

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EXECUTIVE SUMMARY

Under the Clean Air Act Amendments of 1990, areas designated as nonattainment for air quality standards are required to review their current transportation plans and programs to ensure conformity with the applicable state air quality implementation plan. Air quality in the Baltimore region exceeds the National Ambient Air Quality Standard for 8-hour ozone and fine particulate matter (PM2.5). Air quality in the Baltimore region exceeds the NAAQS for 1-hour ozone; however, this standard was revoked on June 15, 2005. The Baltimore region is currently in a maintenance phase with respect to the Carbon Monoxide (CO) standard.

On April 15, 2004, EPA designated the Baltimore region as nonattainment for the 8-hour ozone standard which became effective on June 15, 2004. Conformity analyses for the 8-hour ozone standard have been completed under the methodology provided in the Conformity Rule Amendments released by EPA on July 1, 2004, and in concert with supplementary guidance released in July 2004. The 1-hour ozone State Implementation Plan, prepared by the Maryland Department of the Environment, contains emissions budgets for volatile organic compounds and nitrogen oxides (NO_x). The mobile emission budgets established in the most recent revised version of this plan have been found adequate for use in conformity determinations by EPA.

Earlier this year, the Baltimore Regional Transportation Board conducted a conformity analysis of the 2004 Baltimore Regional Transportation Plan and the federal Fiscal Year 2006-2010 TIP for the Baltimore region, for the 8-hour ozone standard, and for the CO standard. At this time, the BRTB is transitioning into including PM2.5 in conformity determinations. Since a conformity determination has already been performed on the FY 2006-2010 TIP and the Plan to address the 8-hour ozone standard and the CO standard, this supplemental conformity determination will only address the PM2.5 standard. This conformity determination uses the same inputs as the 8-hour ozone and CO conformity determination of the Plan and the FY 2006-2010 TIP; however, the transit network has been updated due to bus route changes. The PM2.5 standard is a 24-hour standard as well as an annual standard; however, the Baltimore region is only violating the annual standard. Therefore, a regional emissions analysis was performed for the annual standard.

Conformity analysis approval by US DOT for the new PM2.5 standard is required by April 5, 2006. MDE is required to submit an attainment plan for the new PM2.5 standard to EPA by April 5, 2008. This supplemental document covers the PM2.5 conformity determination of the FY 2006-2010 TIP and the Plan. Because there are currently no adequate or approved State Implementation Plan budgets for PM2.5, an interim emissions test was applied in this conformity determination. There are two options for implementing the interim emissions test for PM2.5 nonattainment areas: 1)"build ≤ no build" or, 2)"no-greater-than-2002 baseline" tests. This conformity analysis used the no-greater-than-2002 baseline interim emissions test. Conformity was tested against the 2010 attainment date for the PM2.5 standard as well as against the other horizon years of 2020 and 2030.

This conformity determination is undertaken by the BRTB, in its capacity as the Metropolitan Planning Organization for the Baltimore metropolitan area. The BRTB, assisted by the Baltimore Metropolitan Council and in conjunction with the Maryland Departments of the Environment and Transportation, conducted a comprehensive analysis of conformity of the Plan and the TIP for the Baltimore region. The approach to conformity has been developed in concert with the final transportation conformity rule issued by EPA on November 24, 1993 (58 FR 62187) and subsequent amendments. Consideration was also given to federal guidance in response to negotiated settlements between federal agencies and interested environmental groups.

Section I. Transportation and Air Quality Planning Process

The first section of this conformity document reviews the transportation planning process in relation to air quality goals and objectives. This section also reviews air quality and public participation processes and long-term planning efforts, particularly related to air quality/emission reduction strategies.

Section II. Quantitative Assessment of the Plan and TIP with Air Quality Goals

The second section of this conformity document details the technical and quantitative analyses undertaken during the conformity determination process. The technical analysis of the Plan and TIP uses computer model applications to estimate emissions of direct PM2.5 (from exhaust, brake wear and tire wear) as well as emissions of the PM2.5 precursor NO_x, which are associated with the implementation of projects in the Plan and TIP. A determination of conformity with the interim emissions tests was based on MOBILE6.2 model results, as well as reductions from the various emission reduction strategies provided from the application of procedures assessed outside of modeling, or "off-model."

The net result of the MOBILE6.2 and off-model analyses indicates that emissions of mobile source air pollutants are consistent with §93.109 and §93.119 of the Final Transportation Conformity Rule Amendments of July 1, 2004, which state that PM2.5 nonattainment areas with no approved or adequate motor vehicle emissions budget from an applicable implementation plan must satisfy the interim emissions test. **The emissions predicted in the "Action" scenarios are no greater than 2002 emissions.**

Section III. Status Report on Implementation of Emission Reduction Strategies (ERS) in the Baltimore Region

The third section of this document presents an updated status report on emission reduction strategies in the Baltimore region. After a thorough examination of specific actions either already taken, currently underway, or planned, it was determined that the Baltimore region has been successful in progressing toward full implementation of the previously-funded ERSs and has implemented innovative ERS-type strategies aimed at reducing vehicle use and associated emissions.

Section IV. Conclusions

This final section of the document identifies key conclusions reached in determining the air quality conformity of the FY 2006-2010 Transportation Improvement Program and 2004 Baltimore Regional Transportation Plan for PM2.5.

CONCLUSIONS

The analysis presented in this report documents the applicable procedures that were followed and the criteria that were satisfied to determine that the 2004 Baltimore Regional Transportation Plan and 2006-2010 Transportation Improvement Program conform with the requirements of the Clean Air Act Amendments of 1990. This analysis evaluates emissions of PM2.5 and the PM2.5 precursor NO_x.

Based on this analysis, the Baltimore Regional Transportation Board believes that the following major criteria are hereby satisfied:

- *The projects in the 2006-2010 TIP come from a conforming transportation plan that has been developed in concert with the spirit of the metropolitan planning requirements of the Transportation Equity Act for the 21st Century;*

- *The Plan and TIP are consistent with the interim emissions tests for direct PM2.5 and the PM2.5 precursor NOx;*

- *The TIP provides for the expeditious implementation of emission reduction strategies that attempt to reduce mobile source emissions by reducing vehicle trips, cold start emissions, vehicle miles of travel and highway congestion.*

Therefore, it is the conclusion of the Baltimore Regional Transportation Board, in its capacity as the Metropolitan Planning Organization for the Baltimore region, that implementation of the projects in the 2004 Plan and the 2006-2010 TIP does not worsen the region's air quality or delay the timely attainment of national ambient air quality standards.

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I. TRANSPORTATION PLANNING AND AIR QUALITY CONFORMITY PROCESS

A. MPO MISSION AND PLANNING FACTORS

As mandated by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and its successor, the Transportation Equity Act for the 21st Century (TEA-21), the Baltimore Regional Transportation Board works to carry out the metropolitan transportation planning process. The transportation laws call for the metropolitan planning organization to provide a "continuing, cooperative, and comprehensive transportation planning process that results in plans and programs that consider all transportation modes and supports the metropolitan community development and social goals." [23 CFR Part 450, Metropolitan Planning Rule, October 28, 1993] The BRTB acknowledges the most recent federal transportation legislation, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, that was signed into law on August 10, 2005.

Consistent with the direction provided by federal transportation law and regional policy priorities, the mission of the BRTB is to develop, promote and ensure implementation of a regional transportation plan that:

> *(A) Supports the economic vitality of the metropolitan area;*
>
> *(B) Increases the safety and security of the transportation system for motorized and nonmotorized users;*
>
> *(C) Increases the accessibility and mobility options available for people and freight;*
>
> *(D) Protects the environment, promotes energy conservation, and improves quality of life;*
>
> *(E) Enhances the integration and connectivity of the transportation system across and between modes for people and freight;*
>
> *(F) Promotes efficient transportation system management and operation;*
>
> *(G) Emphasizes the preservation of the existing transportation system; and*
>
> *(H) Promotes an efficient relationship between land-use and transportation that maximizes the use of existing and future public programs and infrastructure.*

These planning factors represent the spirit of the MPO's commitment to develop a transportation network that is responsive to regional needs.

B. CONSISTENCY WITH BALTIMORE REGIONAL TRANSPORTATION PLAN

In the process of formulating the 2006-2010 TIP, the Plan was reviewed to ensure that programmed projects were consistent with the initiatives, policies, and goals of the Plan. This analysis determined that regionally significant capacity expansion projects were included in the evaluation.

C. PROCESS FOR AMENDING THE BALTIMORE REGIONAL TRANSPORTATION PLAN

In response to federal law and regulations, the BRTB developed a dynamic process for amending the Plan that meets federal requirements and involves participation from MPO members and from the public. The process also requires that proposed projects be subjected to a formal air quality conformity analysis to ensure that the Plan retains its conformity status under the Clean Air Act Amendments of 1990. In

addition, the proposed projects must be affordable under the federal fiscal reasonableness requirement for transportation plans. Projects are subject to a public review and comment process.

D. INTERAGENCY CONSULTATION

Under Section 93.105 of the conformity regulations, each State Implementation Plan revision must include procedures for interagency consultation before making conformity determinations, and also procedures to be undertaken by air quality agencies and transportation agencies before developing applicable implementation plans. Final procedures for consultation were prepared and formally endorsed by consultation members (TSC Resolution 96-12). After public review and comment, the ICG process was codified by 1997 Maryland state regulations (26.11.26).

The final consultation procedures were developed through a cooperative effort involving the MPO staff, MDOT and MDE staffs, and FHWA representatives. These procedures provide the framework that the MPO follows in making conformity determinations.

The ICG meets formally to discuss and recommend appropriate procedures for determining conformity of the Plan and TIP. These meetings are critical to the findings reported in this document, as well as to the development of the consultation procedures that will govern future conformity determinations. ICG meetings provide an additional forum for public participation and input to the process, including comments on technical methodologies. Meetings are advertised on the Internet. Mailings (including agendas, minutes, and any necessary materials) are sent to all interested parties. Please see Appendix A for more information on the ICG and how to participate.

ICG Meetings Specifically Addressing this Conformity Analysis

August 10, 2005	Discussion of methodology/assumptions
September 13, 2005	Review and approval of methodology/assumptions
October 12, 2005	Review and approval of draft conformity results
November 9, 2005	Review and approval of conformity document

E. PUBLIC PARTICIPATION

The MPO approved formal public participation procedures in September 1994. In the spirit of providing increased opportunities for public participation in the metropolitan transportation planning process, a new Public Involvement Plan was created in March 2001 in coordination with stakeholders and revised in April 2004. The public involvement procedures provide an expanded framework and methodology for involving the public in all metropolitan planning activities. This update includes a commitment to review the procedures annually. Please see Appendix A for more information on obtaining a copy of the Public Involvement Plan.

Specific opportunities for public participation during the development of the TIP included the following:

> *April 19-May 19, 2005 – First Draft TIP project list available for review and comment by public.*
>
> *May 19, 2005 – First opportunity for public meeting on the draft 2006-2010 TIP.*
>
> *June 1, 2005 – Draft TIP available for formal public review.*
>
> *June 7, 2005 – Opportunity for public comment to regional elected officials.*

> *June 30, 2005 – Second and final public meeting.*
>
> *August 23, 2005 – Opportunity for public comment before final approval by BRTB.*
>
> *[Public notice displayed in Appendix B. Summary of meetings will be contained in Appendix B]*

Specific opportunities for public participation during the development of the Conformity Determination of the Plan and TIP for Fine Particulate Matter included the following:

> *September 13, October 12, November 9, 2005 – ICG reviews stages of conformity analysis, including determination of planning assumptions, modeling approach, and draft results, at open meetings.*
>
> *October 11 , 2005 – Status of conformity analysis presented at Technical Committee meeting.*
>
> *November 2, 2005 – Draft Conformity Determination available for formal public review.*
>
> *December 13, 2005 – Opportunity for public comment before final approval by BRTB.*

An opportunity was made available for a public meeting on the final draft conformity determination of the Plan and TIP for fine particulate matter.

F. ONGOING RELATED PLANNING ACTIVITIES

F.1. Transportation and Land Use

The region is engaged in a number of activities that are aimed at better understanding and coordinating the interaction between transportation and land use. Such activities include research into the links between land use and travel behavior, enhancements to analytic tools to better incorporate the effects of land use, and an increased dialogue on land use-planning policy and planning issues with BMC members.

The Baltimore Region Transit Plan by the Maryland Transit Administration was completed in 2002. The plan recommends construction of a complete rail system to connect the region, comprised of six lines – some completely new and some extensions of existing rail services. When completed, the system would expand coverage from 43 miles and 54 stations to 109 miles and 122 stations. In addition to interconnecting the city with the surrounding suburban jurisdictions and emerging growth centers, this expansion will transform the existing Metro and Central Light Rail lines from independent services into a connected regional system. Such a connection may assist the City's role in the regional marketplace, and stimulate new employment and housing opportunities.

In conjunction with the initial MTA Red Line planning and design effort which includes both alignment, and station workgroup planning for the corridor between the Social Security Administration and Canton, the Maryland Department of Planning has focused on Transit Oriented Development prospects. A series of TOD visioning activities was held – first considering the State Center Metro station area, and then considering 4 possible Red Line station areas in Baltimore City and Baltimore County.

The Owings Mills station on the existing Metro line, an additional TOD land use initiative, has been under consideration for years but has failed to gain momentum. In 2002, with assistance from an EPA Clean Air Transportation Communities grant, Baltimore County, the State, and the Maryland Department

of Planning participated in a study to examine the transportation and air quality benefits associated with a TOD at Owings Mills. A joint decision was made to review a much broader set of development concepts for the entire Owings Mills Growth District. Based on favorable results from the EPA study, the proceedings are focused on potential for implementation, and the development is included in the TIP as a regionally significant initiative. If successful, a TOD at Owings Mills could serve as a model for focusing development around transit region wide, particularly in conjunction with the Baltimore Region Transit Plan investigations.

F.2. Bicycle and Pedestrian Planning Activities

In 2002, the Maryland Department of Transportation completed a twenty-year Bicycle and Pedestrian Access Master Plan. Since then, MDOT has focused on not only engineering, but also education and enforcement. Through the Maryland Highway Safety Office, MDOT funded an effort to develop a state-wide bicycle education program. The pilot program included a trainer, curriculum and a secure trailer stocked with youth bicycles and helmets. The pilot program was launched in Montgomery County, and was deemed a success. The program reached the Baltimore region in 2005, with the addition of a new secure trailer, and with a "Train the Trainer" program designed to prepare educators and others to deliver the curriculum.

The Maryland Bicycle and Pedestrian Advisory Committee with assistance by MDOT completed a legislatively mandated Safe Routes to Schools demonstration project at two Maryland elementary schools, one of which was Montebello Elementary School in Baltimore. A report was submitted to the Governor and General Assembly in July, 2003. The program seeks to encourage students to walk and bike to school rather than be driven in school buses or by parents. One benefit of the program is a reduction in motor vehicle trips and the associated tailpipe emissions. On September 23, 2004 FHWA presented a pilot workshop in the Baltimore region. The event at Cross Country Elementary School in Baltimore City provided participants with the opportunity to understand the implementation of a Safe Routes to Schools initiative.

On March 15-18, 2005 the Walkable Community Workshop program was presented by the National Center for Bicycling and Walking; coordinated by the Baltimore Metropolitan Council, Anne Arundel County, Baltimore City, Baltimore County and Carroll County; and funded with a grant from the Governor's Highway Safety Office. The workshop gathered community leaders, elected officials, pedestrian and bicycle advocates, local, regional, state and federal employees, business owners, business association representatives and leaders of faith-based communities to discuss real-world pedestrian problems in communities and develop strategies for solutions to improve the walking environment.

For the program, the National Center of Bicycling and Walking provided a team of two trainers to present eight four-hour workshops over a five-day period. During each workshop, the trainers delivered a presentation on the elements of a walkable community and solutions to common problems. The trainers then led participants on an interpretive walking tour (called a "walkabout" or "ped audit") of a pre-determined study area. During the walkabout, trainers emphasized the perspective of the pedestrian in the community. Following the walkabout, participants gathered in small groups to identify both general and specific measures to improve conditions for pedestrians. The trainers compiled the measures identified, and lead discussion to build consensus and prioritize the measures.

On April 15, 2005, the BRTB in conjunction with the U.S. Access Board presented the *Designing Accessible Public Rights-of-Way* workshop. The event provided participants with current information on requirements for public agencies to comply with the Americans with Disabilities Act provisions in the design and construction of pedestrian facilities within public rights-of-way. This session covered details of Title II of the ADA which applies to state and local government services, as well as information regarding the 2002 Draft Guidelines for Accessible Public Rights of Way.

Outreach efforts included Bike-to-Work Day 2005. The BRTB directed region-wide event planning activities, as well as co-directed the Baltimore City event. Efforts included overall planning, partner coordination, sponsorship development, collateral material development including website and print media as well as wearables, media relations, how-to-clinic planning and presentation. Both momentum and attendance reached an all-time high for the regional event, with over 400 registrants.

Also through the MHSO, MDOT continued to fund the Pedestrian Safety Enforcement Initiative, a two-day enforcement training for police officers, as well as provided additional funding to cover overtime expenditures in jurisdictions implementing pedestrian stings. The pedestrian sting has become popular in the region and state as a tool for both education and enforcement.

Engineering improvements for pedestrian and bicycle facilities include the introduction of countdown pedestrian traffic signals, which inform pedestrians as to the amount of time available to cross a roadway, and SHA's stated goal of providing 200 miles of marked bicycle lanes throughout Maryland by December 31, 2006.

Each jurisdiction in the Baltimore region continued efforts to improve bicycle and pedestrian accommodations. Planning efforts include Baltimore County, where the Office of Planning recently completed the Eastern Baltimore County Pedestrian and Bicycle Access Plan, and will soon commence work on the Western Baltimore County Bicycle and Pedestrian Plan. When the final plan is approved by the Baltimore County Council it is expected to serve as a model for preparing pedestrian and bicycle plans throughout the County. The Baltimore City Bicycle Master Plan is now underway. Public participation at the initial public involvement session exceeded 100 people.

F.3. Planning Studies

MARC Master Plan

Update to the 1994 MARC Master Plan, including system preservation, need analysis, patronage forecast, potential extension and capacity analysis for existing lines. Project should be completed in early FY 2006. This federal-aid amount is $1,500,000 and is funded through the Section 5307 funding program under the direction of the Office of Planning.

Red and Green Line Transit Corridor Study

Prepare Alternatives Analysis/Draft Environmental Impact Statements, which will evaluate transit improvements in the Baltimore Region Transit Plan's recommended, Phase 1 priority, Red and Green line corridors. The Red Line corridor extends from approximately Woodlawn to Patterson Park and the Green Line extension corridor continues from Johns Hopkins Hospital Medical Campus to approximately Morgan State University. Both studies are being conducted as part of EPA and FTA requirements for Federal funding eligibility to engage in detailed design and construction. The purpose of the DEIS is to examine the engineering feasibility, potential benefits, costs, and social, cultural economic, built, and natural environmental impacts of feasible alternatives that will improve transit mobility in the Baltimore metropolitan area. The DEIS will examine and evaluate new rail alignments, bus service improvements, transportation systems management/ transportation demand management strategies, and a no-build alternative. The federal-aid amount is $385,000 and is funded through the Section 5307 funding program.

Kirk Division Expansion Study

A planning study to develop an expansion plan for the Kirk Bus Division (Kirk Avenue at Bonaparte Avenue). This work will entail site selection, site analysis and development of conceptual plans and cost estimates for the division. The study will include the feasibility of replacing the Kirk Division Buildings. Based on the study, a plan will be developed to show the impact on manpower levels, productivity,

operations and maintenance. This study is currently underway and is expected to be completed in FY 2006. The federal-aid amount is $515,000 and is funded through the Section 5307 funding program.

MARC Odenton Parking Expansion D & E

This project entails project-planning activities for expanding parking at the Odenton MARC Station. This phase of the project includes site selection, preparation of environmental document, design plans and development of short-term solutions to overflow parking. It also includes long-term parking expansion study to assess a garage or parking deck. This project should be completed by February 2006. The federal-aid amount is $500,000 and is funded through the Section 5309 Fixed Guideway funding program under the direction of the Office of Planning.

Bus Facility Master Plan Study – (New)

Develop a system-wide master plan that presents a sequence of projects that can be phased over time that will lead to a more efficient and safer operating environment for the bus mode. The Master Plan will examine previous facility plans, existing bus facilities, projected operations, new technologies, worker safety, and ridership demand to develop recommended capital projects for rehabilitation and improvements to bus facilities to meet future needs. The master plan is intended to serve as a guide to promote a logical progression in programming, planning, and completing projects within the context of a system-wide approach to managing improvements to bus facilities over a ten to twenty year time horizon. The total amount budgeted for the study is $400,000 of state funds and it is expected to be completed in the summer/fall of 2005 under the direction of the Office of Planning.

Lexington Market Transit Improvements

Develop a phased-in master plan with cost estimates for Lexington Market Transit Improvements. Elements to be included are relocation of the southbound LTR station, weatherization treatments, relocation of escalators, the addition of a second set of elevators at the southern entrance/exit, landscape improvements, uniform shelters at bus stops, signage, enhancements to the plaza, improvements to the Operations Control Center building for the Metro Rail Subway, and coordination with joint development initiatives. Budget is $250,000 and is funded by the state. Responsibility by the Office of Planning is complete and now the Office of Engineering is directing work activities.

Central Maryland Transit Operations and Maintenance Facility

Planning for storage and maintenance facility for use by Connect-A-Ride and Howard Transit with potential for future Anne Arundel program. Includes site selection, environmental documentation and preliminary engineering. Locally operated transit services in Central Maryland are administered by Corridor Transportation Corporation and contracted to Yellow Transportation, crossing three jurisdictions: Howard County, Anne Arundel County, and a small portion of Prince George's County. MTA conducted a needs analysis that warrants a centrally located transit operations and maintenance facility. The proposed facility includes storage, maintenance, training, operations and administrative areas. Budget is $1,100,000 and is funded from state and local sources. Site selection is ongoing.

Automated People Mover System at BWI Airport

The intent of this effort is to develop a concept definition for an automated people mover system at Baltimore/Washington International Airport. This two-phased project includes a Ground Transportation Demand Analysis and Alternatives Development and Analysis. The Ground Transportation Demand Analysis will focus on examining the overall ground transportation network serving the Airport and defining the need for improved ground transportation considering an APM as a solution. Specific tasks will include analyzing existing conditions, projecting future ground transportation demand, and determining how an APM will impact future requirements for ground transportation and customer

service. Even more importantly, the analysis will consider the overall transportation network linking the Consolidated Rental Car Facility, the BWI Rail Station, Daily Parking Garage, future Airport Administration Office Building, and the existing and future Terminal Building.

Essential to this exercise is the collection of existing data and preparation of environmental resource inventory maps to be used in future analysis of the APM corridor. Once the need for an APM solution is verified, future task assignments will include preparation of alternative APM alignments and recommendations on facility requirements and operating scenarios. After a preferred development program has been identified, capital costs and financing options will be identified. This will result in a final concept definition study that will be coordinated with and integrated into the upcoming Airport Master Plan.

BWI Master Plan and Environmental Analysis

A study to identify long-term projection, location and extent of facility improvements to meet future aviation demand. Study will require in-depth evaluations of many factors, including future air service, runway and terminal capacities, environmental and community impact considerations. Phase I of the master plan, which will develop forecasts of aviation demand and assess the demand/capacity of the existing facilities, will start in FY06 and conclude in FY07. (Maryland Aviation Administration - $3.8 million - AIP funds)."

Task Force on Traffic Capacity Across the Chesapeake Bay

The purpose of the Task Force is to provide a statewide and public perspective on the needs associated with crossing the Chesapeake Bay and the scope of future initiatives to address the needs. The Task Force process will take 8 to 12 months to complete and will begin in spring 2005. There are no Federal funds being used for this effort. The Maryland Transportation Authority funds this effort. ($350,000)

I-95: Section 200, north of MD 43 to north of MD 22

Project planning study to investigate improvements to address capacity and safety needs on I-95 from south of MD 43 to north of MD 22 and thereby improve access, mobility and safety for local, regional and inter-regional traffic, including passenger, freight, and transit vehicles. Project planning will begin in FY 2005 and extend into FY 2007. There are no Federal funds being used for this study. The Maryland Transportation Authority funds this study. ($5 million)

Dredged Material Management Program

The Dredged Material Management Program of the Maryland Port Administration provides the structure for decision-making that enables the Port of Baltimore to compete as a world-class seaport with an excellent channel system, and as a vital part of Maryland's economy. The goal of this program is to identify management strategies for the material dredged from Port of Baltimore navigation channels for at least the next 20 years. The budget for this project is $3 million and interim reports are expected in spring of 2006.

Statewide Freight Study

MDOT's Office of Planning and Capital Programming is considering a planning study to supplement the 2001 Maryland Freight Mobility Plan. An area of particular interest is obtaining reliable freight data to better implement strategies identified in the Freight Mobility Plan. Other areas to consider are the physical and operational chokepoints in the freight movement system and economic effects of freight transportation services. OPCP is currently evaluating a study scope of service.

Port of Baltimore Landside Access Study

Report on a transportation landside access to Maryland's Port of Baltimore is underway and expected to be complete in the fall of 2005. The overall goal of this regional transportation vision is to determine what regional land transportation improvements are necessary to benefit access to and mobility to, from, and around Maryland's Port of Baltimore over a 20-year timeframe. The consultant team has conducted well over 600 surveys at public and private terminals (Seagirt, Dundalk, North Locust Point, Rukert and C. Steinweg) to understand travel patterns and has received an excellent 60% response rate. The project is using State funding sources ($210,000).

MD 295, Baltimore Washington Parkway

A study to widen MD 295 from 4 to 6 lanes from MD 100 to I-195, including an interchange at Hanover Road (3.27 miles). This study will also consider Hanover Road from the CSX railroad tracks in Howard County to MD 100. This project would help ease congestion and improve access to one of the State's economic engines, the Baltimore-Washington International Airport. Project Planning is to begin during FY 2005 and funded from state and federal (NHS) sources. ($2.2 million)

MD 140, Baltimore Boulevard

A study to consider capacity improvements along MD 140 between Market Street and Sullivan Road through Westminster. Bicycle and pedestrian facilities will be provided (2.46 miles) as part of the improvements. This project is intended to relieve existing congestion and provide additional capacity for planned growth and economic development within the Priority Funding Area. Project planning is underway using State funds. ($654,000)

MD 32, Patuxent Freeway

A study to upgrade existing MD 32 from MD 108 to I-70 to address safety concerns (9.06 miles). This project would address safety problems, which have been experienced as a result of increasing traffic volumes on the existing two-lane roadway. Project planning is underway ($700,000 using State funds). Protective right-of-way funding will be used as properties become available.

II. QUANTITATIVE ASSESSMENT OF THE PLAN AND TIP CONFORMITY WITH AIR QUALITY GOALS

The Clean Air Act Amendments of 1990 require metropolitan areas in nonattainment of air quality standards to perform technical studies on the conformity of the region's long-range transportation plan and program with state air quality goals. Since the passage of the CAAA, EPA released a final rule on November 24, 1993 outlining methods for nonattainment areas to conduct conformity analyses of plans and programs. EPA has amended the final rule on the following occasions: August 7, 1995, November 14, 1995, August 15, 1997, July 1, 2004, and May 6, 2005.

In 2004, EPA amended the Conformity Rule to reflect the new PM2.5 standard. According to the July 1, 2004 final rule, conformity applies for PM2.5 nonattainment areas after a one year grace period following nonattainment area designations. Therefore, conformity analysis approval by federal agencies for the new PM2.5 standard is required by April 5, 2006. PM2.5 nonattainment areas that do not have approved or adequate motor vehicle emissions budgets must use an interim emissions test. For this conformity determination, the no-greater-than-2002 baseline interim emissions test was used.

On May 6, 2005, EPA amended the Conformity Rule to add the PM2.5 precursors: nitrogen oxides (NO_x), volatile organic compounds (VOCs), sulfur oxides (SO_x), and ammonia (NH_3). Before SIP budgets are established, there must be a regional emissions analysis for NO_x ***unless*** it is found to ***not*** be a significant contributor. Regional emissions analyses are ***not*** required for VOCs, SO_x, and NH_3 ***unless*** any of them are found to be significant contributors. For the Baltimore region nonattainment area, VOCs, SO_x, and NH_3 have not been found to be significant contributors; therefore, the only PM2.5 precursor addressed in this conformity analysis was NO_x. Direct emissions of PM2.5 from exhaust, and brake and tire wear were also addressed. Re-entrained road dust has not been found to be a significant contributor to date and therefore was not addressed. Construction dust does not need to be addressed before SIP budgets exist.

Conformity analysis of plans and programs in the Baltimore region is performed by the BRTB, in its role as the designated MPO for the Baltimore region. Technical assistance is provided by the staff of the Transportation Planning Division of the BMC. BMC staff applies the travel forecasting model to horizon year scenarios to assess highway and transit system travel and speed impacts of implementing the region's proposed transportation plan and program. Upon completion of travel forecasting, MDE uses the MOBILE6.2 computer model to estimate the emission effects of the projected transportation system usage and performance characteristics.

A determination of conformity of the Plan and TIP, for PM2.5, was made using the no-greater-than-2002 baseline interim emissions test. This test involved a series of computer model runs analyzing emissions from the implementation scenarios associated with projects contained in the Plan and TIP compared with 2002 baseline emissions. The conformity determination was based upon technical analyses indicating that:

> *(1) Emissions of the PM2.5 precursor NO_x associated with the implementation scenario would be no greater than 2002 emissions.*
>
> *(2) Emissions of direct PM2.5 from exhaust and brake and tire wear associated with the implementation scenario would be no greater than 2002 emissions.*

A. TECHNICAL METHODOLOGY

A.1. Conformity Determination

In early 2005, a comprehensive analysis was conducted for conformity of the Plan and TIP with motor vehicle emissions budgets for VOC, NO_x, and CO, as a pre-condition of its acceptance by federal funding agencies. A supplementary analysis conducted for conformity purposes, and demonstrated in this report, evaluated motor vehicle emissions of PM2.5 using an interim emissions test. A summary of the methods and assumptions used to carefully evaluate the PM2.5 air quality impact of the projects in the Plan and TIP was submitted to EPA, FHWA, and FTA in September 2005 for review and comment. Those methods are explained below. Projects included in the Plan and TIP were assessed with a conformity determination consistent with regional air quality standards. The overall conformity determination of TIP projects was analyzed by the ICG. The ICG also reviewed some individual projects that were difficult to categorize based upon the project description to see if they merited a conformity analysis. Exhibit II-1 displays an overview of the conformity process.

All projects were reviewed and categorized. Each project, depending on the horizon year of review, underwent scrutiny to determine the level of analysis necessary for conformity.

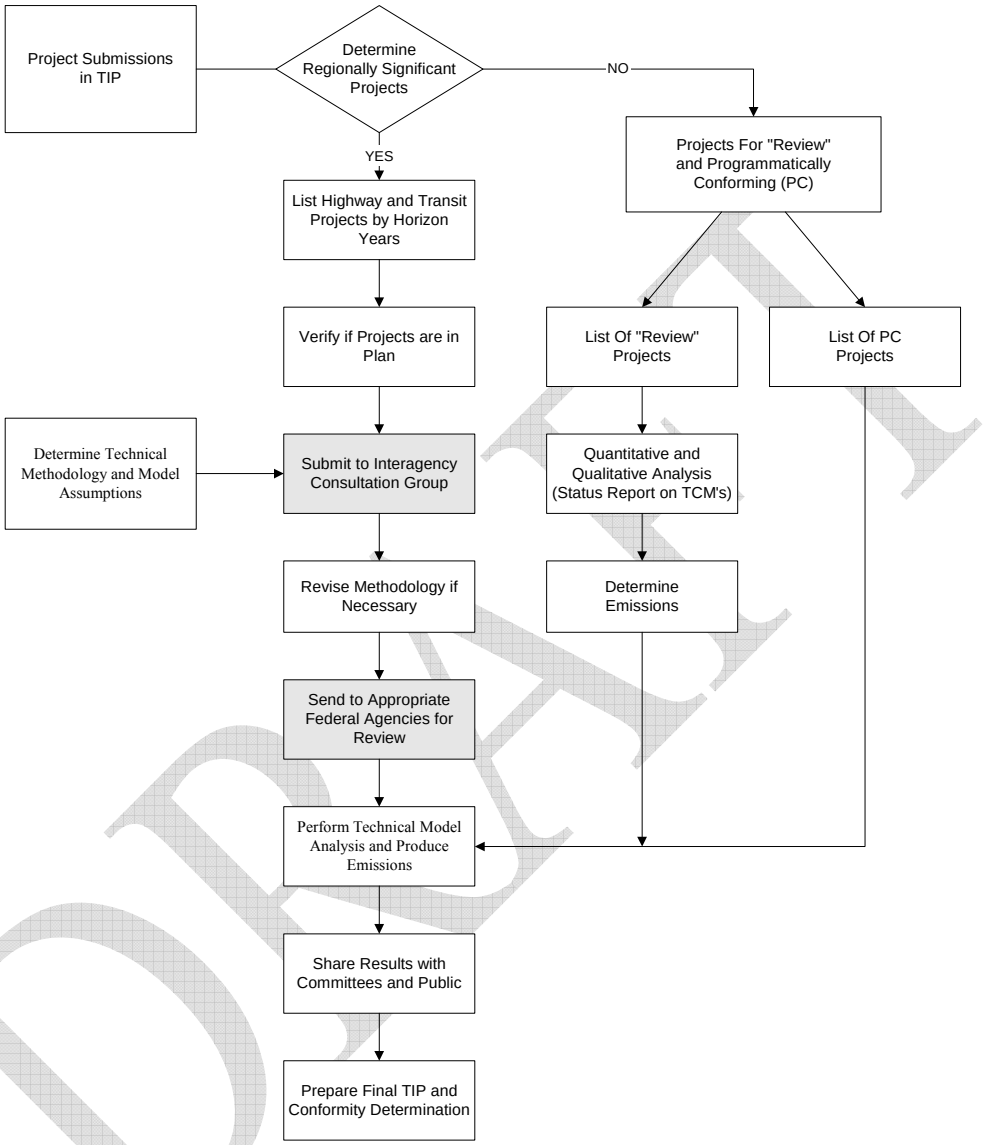
Conformity determination classification falls under one of three options: (1) programmatically conforming (PC), (2) review, or (3) test. Classification of programmatically conforming refers to "neutral" projects that, because of the project's characteristics, do not affect the outcome of any regional emissions analyses. These projects do not impact regional air quality emissions and do not require a separate analysis. These projects usually have an approved categorical exclusion through the National Environmental Policy Act (NEPA). The types of projects that qualify under classification of programmatically conforming are listed in §93.126 of the conformity rule issued by EPA.

TIP projects designated as "review" conformity status by the requesting agency or local jurisdiction were qualitatively and quantitatively analyzed by BMC staff using accepted professional practice to assess conformity to regional air quality standards. These projects are traditionally non-capacity enhancing improvements or transit and rail improvements/services, and because of their local perspective do not qualify for air quality emission consideration in the regional network model. Emission decreases and increases for direct PM2.5 and NO_x for "review" projects were considered in making the conformity determination.

The third "test" conformity classification refers to those projects that are major capacity improvements and require inclusion in the regional highway and transit networks. Examples of this type of project include new or expanded transit services, highway construction (new roads), highway widening (adding at least one travel lane), highway realignment which increases capacity, interchange construction, or new bridge construction (adding at least one travel lane). Bridge repair and deck replacement are not included. A list of these "test" projects, both federally and non-federally funded, is included in Appendix C.

Appendix C lists the projects from the 2006-2010 TIP and 2004 Plan and each associated conformity classification.

EXHIBIT II-I
Overview of Conformity Process



A.2. Planning Assumptions

Selection of Horizon Years

In order to perform the technical analysis for the Plan and TIP, three horizon years were chosen in consultation with representatives from MDOT, MDE, BRTB, FHWA, FTA, and EPA to analyze emission results. The first modeled horizon year is 2010, a near-term year and the year of the attainment date for the PM2.5 standard. The second horizon year is 2020, which is a test scenario no greater than 10 years from the previous horizon year. The final horizon year is 2030, the year of completion of the Plan. The years of analysis have been determined in keeping with federal requirements and were reviewed by the ICG.

Latest Planning Assumptions

Socio-economic Data

Estimates of travel on horizon year networks are based on the completed Round 6-B Cooperative Forecasts. These forecasts were endorsed by the MPO at their August 2005 meeting. The Cooperative Forecasting Group, responsible for the development of regional socio-economic projections that are used in travel demand forecasting, meets periodically to discuss possible modifications and to set the groundwork for future estimates of land use activity. These agreed-upon regional forecasts represent a planning scenario created to extend through 2030. The forecasts estimate the number of households, population, labor force, retail employment, non-retail employment, and median household income by transportation analysis zone for the horizon years of 2010, 2020, and 2030. Appendix D displays jurisdictional totals for the major socio-economic data.

Transit Systems

Since the conformity determination of the 2005-2009 TIP, no changes have occurred in transit operating policies. However, the MTA is performing a comprehensive bus study with the purposes of simplifying routes, improving core frequencies and connectivity to other MTA services, addressing changing transportation trends in the area, improving accessibility and trip speeds through better placements of bus stops, and improving schedules. As part of this study, MTA undertook a comprehensive ridecheck project to gather ridership data on all of its routes and conducted an origin-destination survey. The first phase of changes to local bus routes will take place in October 2005. These modifications were included in this conformity analysis of PM2.5. The next round of changes will occur around June 2006. It is anticipated that in the next conformity document, major changes will be addressed.

Selection of Network Facilities

A series of highway and transit networks was prepared and tested for each modeled horizon year (2010, 2020 and 2030). Criteria for inclusion of highway and transit improvements in the implementation scenarios were reviewed by the ICG, including representatives from MDOT and MDE. (Please see Appendix A for more information on MPO committees.) Computerized highway and transit networks were developed for each horizon year. Projects in implementation horizon years were developed from the Plan and TIP, which were developed in accordance with Code of Federal Regulation (CFR) §450.322. The implementation scenario is the future transportation system that will result from the goals and policies proposed in the TIP and Plan in given horizon years. The following were included:

> *(1) All in-place regionally significant highway and transit facilities, services, and activities;*
>
> *(2) All ongoing travel demand management or transportation system management activities;*
>
> *(3) Completion of all Emission Reduction Strategies and regionally significant projects (including facilities, services, and activities) included in the proposed TIP;*
>
> *(4) All travel demand management programs and transportation system management activities known to the MPO, but not included in the applicable implementation plan or utilizing any federal funding or approval, which have been fully adopted and/or funded by the enforcing jurisdiction or sponsoring agency since the last conformity determination on the TIP;*

> *(5) The incremental effects of any travel demand management programs and transportation system management activities known to the MPO, but not included in the applicable implementation plan or utilizing any federal funding or approval, which were adopted and/or funded prior to the date of the last conformity determination on the TIP, but which have been modified since then to be more stringent or effective;*
>
> *(6) Completion of all expected regionally significant highway and transit projects which are not from a conforming transportation plan and TIP; and*
>
> *(7) Completion of all expected regionally significant non-FHWA/FTA highway and transit projects that have clear funding sources and commitments leading toward their implementation and completion by the analysis year.*

The 2010, 2020, and 2030 highway and transit networks were developed from projects included in the financially constrained Plan and TIP. The staging of Plan projects was also endorsed by the MPO. Specifications for Plan projects were based on the latest estimates of local and state transportation planners and engineers. Member jurisdictions also provided highway and transit project specifications for all regionally significant non-federally funded highway and transit projects that had committed funding sources and could reasonably be expected to be completed by the appropriate analysis year.

A.3. Travel Model Applications

Travel Forecasting Process

BMC staff, serving as technical support to the BRTB, maintains a sophisticated four-step travel demand forecasting model. The model incorporates economic and demographic data to assist in simulating the transportation modeling process: trip generation, trip distribution, mode choice, and trip assignment. Significant changes have been made to the regional travel demand model that have provided a more reliable model for future year projections. With these changes, the model is better positioned to analyze and produce conformity results. The latest model update is documented in Task Report 04-01, and is available upon request. (The Executive Summary and Introduction of Task Report 04-01 are included in Appendix E of this conformity report. Please see Appendix A for more information on obtaining the entire report.)

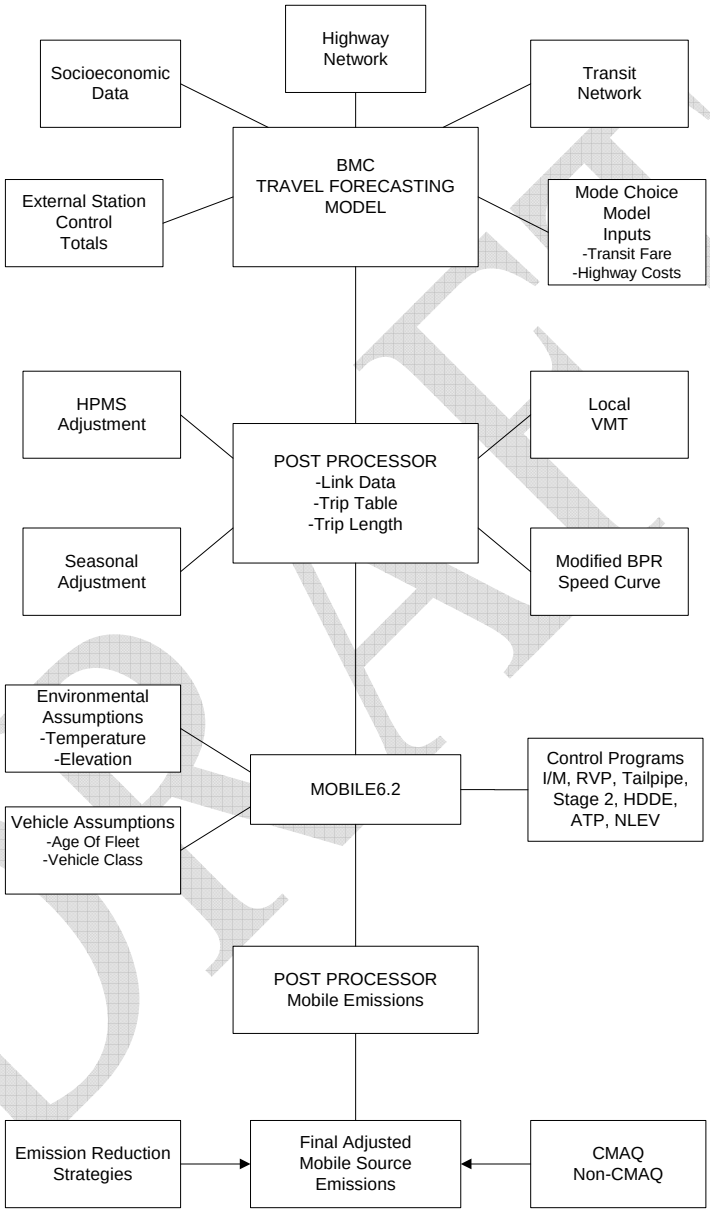
The software package of TP+ and Viper serves as the technical basis for the quantitative analysis. Representative highway and transit networks and trip tables were developed to correspond with conditions found in 2000 and 2002, and expected in the horizon years of 2010, 2020, and 2030. Major modifications to the travel demand model, as referenced in Task Report 04-01, include:

- Maintenance of master highway network within the ESRI geographic information system;
- Network assignment of HOV restricted lanes and Electronic Toll Lanes;
- Enhanced zonal structure (compatible with 2000 Census Geography);
- Assignment of simulated drive access transit trips, thus capturing additional vehicle travel; and
- Use of equilibrium traffic assignment method.

Update of the Baltimore Region Travel Demand Model

While the enhanced model was developed to estimate conditions expected in 2005 and beyond, the output of the model is verified, or validated, with observed data from the year 2000. An overview of the entire BMC air quality modeling process is shown in Exhibit II-2.

EXHIBIT II-2
Air Quality Modeling Process



Trip Generation

The latest planning assumptions by regional transportation analysis zone were used as inputs to the trip generation model. The output of this module is the number of trip productions and attractions by each of the model's zones and external stations for each of the following purposes:

• Home-Based Work (HBW)	• Work-Based Other (WBO)
• Home-Based Shop (HBSh)	• Other-Based Other (OBO)
• Home-Based Other (HBO)	• Commercial Vehicle (CV)
• Home-Based School (HBSch)	• Medium Truck (MT)
• Heavy Truck (HT)	

Trip productions for the non-truck purposes are based on the 1993 Household Travel Survey, using per household rates for each cell of a four dimensional matrix of trip purpose, number of persons per household, vehicles per household, and area type. For the home-based purposes, total motorized and non-motorized trips are generated and then put through a logit process (based on autos per person and the land use density of a zone) to determine the motorized (auto and transit) trips. See below for a discussion of trip generation for the non-home-based trips (WBO and OBO).

Trip attractions were calculated based on the 1993 Household Travel Survey. Regression equations were developed for HBW, HBSh, HBO, and HBSch:

HBW: $1.73E_R + 0.71E_N$

HBSh: $2.21E_R + 0.36H$

HBO: $3.6E_R + 1.19H$

HBSch: $5.17E_S + 0.54H$

where E_R = Retail Employment E_N = Non-Retail Employment

E_S = School Employment H = Households

These attractions are then multiplied by scaling factors to account for differences in land use density. Work-Based Other and Other-Based Other, the two non-home-based purposes, have special treatment. It is assumed that these trips are produced by the zone in which the tripmaker dwells, but the trip is likely to have either or both ends in another zone. In order to simulate this, motorized productions were calculated based on the rates, but an allocation methodology was then used to turn these trips into origins and destinations. Regression equations with inputs of households, retail employment, and non-retail employment are used to generate origins and destinations, which are then scaled to match productions separately in the Baltimore and Washington regions.

Truck and commercial vehicle productions and attractions were updated based on a method called adaptive assignment. [*Allen, W.G.* Adaptable Assignment*, presented at the Sixth TRB Conference on the Application of Transportation Planning Methods, May 1997*] Documentation on the procedure and calibration is available on request. Below is a summary of the steps used to develop the new truck and commercial vehicle models:

1. Obtain and enter classified vehicle truck counts at 600+ locations on travel model highway links (medium trucks = 2 axle, 6 tire and heavy trucks = 3+ axles).

2. Obtain commercial vehicle counts by conducting roadside surveys at 113 classification count locations to estimate a share of observed commercial vehicles. Create a lookup

table from data to estimate commercial vehicle counts at all 600+ classified count locations.

3. For each of the three trip purposes, develop a trip table that best matches the observed traffic counts.

4. The Quick Response Freight Manual Approach – with Phoenix, AZ trip rates – was used as an initial starting point. Modifications were made to this model using models from other areas to create an interim set of models. This interim set of models was compared with the trip tables derived from the traffic counts and iteratively improved using the adaptable assignment methodology. Improvements to the models were added, including sensitivity to jurisdiction, land use, truck prohibitions, and truck special generators.

5. After adaptable assignment had achieved the best match for each of the three truck purposes, the difference between the trip table observed from the traffic counts and that estimated from the model, was a small calibration matrix called the delta table. The consultant did some analysis and found that a multiplicative delta would be better than an additive delta table in future year forecasting. As a result, the delta table is a ratio table of the base year model trip table to the base year count trip table that is applied to all forecast years.

Productions and attractions for the region's external stations were developed from traffic projections by the SHA which are split by purpose and factored to person trips. External trips are generated for all purposes except Home-Based School.

Trip Distribution

Trip distribution was based on a combination of free flow and peak period travel speeds. HBW, HBO, HBSh, and WBO trips are concentrated in the peak periods. These trips were distributed based on a congested a.m. peak (6:00 a.m. – 10:00 a.m.) highway network. The remaining trip purposes were distributed on a free flow network. Following trip distribution, HBW, HBSh, and HBO trips are stratified into three income levels ($0-10,000, $10,000-30,000, and $30,000 and above).

Mode Choice

The mode choice module creates automobile and transit trip tables. Transit networks were developed to be compatible with the highway network scenarios. These networks are skimmed and, with various other input data, a logit model is used to calculate the number of person trips using the following modes:

- Single Occupant Vehicle
- 2-Person Vehicles (HOV-2)
- 3-Person Vehicles (HOV-3)
- 4-Person or more Vehicles (HOV-4+)
- Walk to Bus
- Walk to Rail (Metro, Light Rail)
- Walk to MARC
- Drive to Bus
- Drive to Rail (Metro, Light Rail)
- Drive to MARC

The first four trip tables (the driver and passengers) are converted to a vehicle trip table and passed to the assignment stage of the model. The data used in the logit model include:

- Auto In-Vehicle Time
- Transit In-Vehicle Time
- Out of Vehicle Time
- Initial Wait Time
- Number of Transfers
- Auto Cost
- Transit Cost
- Drive Access Time
- Autos per Person
- Destination Land Use Density
- Employment Density
- Population Density

Home-Based School trips are not run through the logit model. Instead, jurisdiction-to-jurisdiction shares are used to calculate the four auto modes and three walk to transit modes. Drive to transit access is not assumed for HBSch.

Drive to transit trips are now used to develop a trip table of origin zones and transit stations. These trips are then assigned to the highway network for all but the first time period. No drive to transit trips are assumed for the period between midnight and 6 a.m.

Trip Assignment

The trip assignment module uses an equilibrium assignment technique. Two speed-delay curves are employed:

Freeways/Expressways: $$T = T_0(1 + 0.2\left(\frac{V}{C_E}\right)^{10})$$

Other Roads: $$T = T_0(1 + 0.05\left(\frac{V}{C_E}\right)^{10})$$

Where T=Congested time

T_0=Free flow time

V=Link volume

C_E=Level of Service "E" Capacity

During the capacity restraint calculation that estimates a new travel speed for the next highway loading increment, a Passenger Car Equivalence is applied. A PCE of 1.5 for medium and 2.0 for heavy truck link volumes is applied. These factors simulate the greater capacity utilized by trucks compared to

passenger cars due to size and operating characteristics (example being slower truck speeds when climbing hills). Volume delay is not applied to centroid connectors.

Simulated Time Periods

Traditionally, travel forecasting for the Baltimore region has been done on a 24-hour basis. Previous transportation studies have evaluated an HOV system with highway lane occupancy restrictions that would operate in the a.m. and p.m. peak periods. In order to simulate the changes in highway capacity on a facility with occupancy restrictions during the peak periods only, BMC staff developed a process to segment the 24-hour trip table by purpose into five discrete time periods:

- midnight to 6:00 a.m.;
- 6:00 a.m. to 10:00 a.m.;
- 10:00 a.m. to 3:00 p.m.;
- 3:00 p.m. to 7:00 p.m.; and
- 7:00 p.m. to midnight

Trips were also split into directional orientation for HBW (e.g., home to work, work to home) and HBNW (i.e., home to shop, shop to home). This segmentation occurs during the balancing process, when HBW, HBSh, HBO, HBSch, MT, HT, and CV trips are converted from production/attraction to origin/destination format.

The factors used for dividing the daily trip table were developed primarily from the 1993 Household Travel Survey with data from the *Traffic Trends* report produced by the State Highway Administration denoting hour of day factors used as a control to "smooth" data by purpose. The 1993 Household Travel Survey information was extracted to update the time of day factors. Appendix F displays the factors that were then applied to the 24-hour vehicle trip table to obtain trips for five distinct periods.

Transit Operating Assumptions

Horizon year transit networks consist of the existing transit system plus expansion and new service proposed in the Plan and TIP. All horizon transit networks consist of existing service provided by the MTA along with local transit service provided in the City of Annapolis and Harford, Anne Arundel, and Howard counties. Modifications to the existing transit system and fare matrix were made to reflect service reductions and fare changes made by the MTA in July 2003. As part of the new mode choice model, BMC staff has developed a parking cost model. The model was developed from information obtained in the 1993 Household Travel Survey, off street parking location survey, and local knowledge. The model uses regression analysis, relating employment density to an average hourly parking charge for a TAZ for HBW, HBSh, and HBO. Using the Round 6B cooperative forecast projections of employment density, an expected average hourly parking cost can be estimated for each horizon year. The logit equations use hourly parking cost to estimate rideshare and transit. The conformity analysis of the TIP and Plan incorporates the parking cost model.

In September 2005, the transit network was updated to reflect Phase I of the Greater Baltimore Bus Initiative, which went into effect in October 2005. Table II-1 contains the transit ridership projections used for conformity determination.

TABLE II-1
Transit Ridership Projections

	2010	2020	2030
HBW	119,200	137,700	140,400
HBSh	7,800	8,200	8,900
HBO	70,300	78,600	79,000
HBSch	12,800	13,100	13,300
WBO	16,800	18,700	17,500
OBO	10,700	11,600	11,100
Total	**237,600**	**267,900**	**270,200**

Electronic Toll Lanes

The Maryland Transportation Authority will be constructing additional capacity on I-95 north of Baltimore. Users of the added capacity regardless of occupancy or vehicle type would electronically pay a per mile toll currently estimated for modeling purposes at 5¢ off peak and 15¢ peak. The effects of toll cost are reflected in trip distribution, mode choice, and route assignment. The toll cost is converted to travel time using $14.00 an hour as the value of time and is added to the ETLs calculated travel time based on the travel speed. The travel cost (time) is fed into trip distribution. During mode choice, the dollar cost of traveling on the ETL is calculated and added to the auto operating cost for the utility of SOV and shared ride. Route choice travel time for all links is based on the travel time to traverse the link, including the toll time where applicable. The assignment algorithm chooses the path that minimizes travel time. During periods of high congestion, the ETLs become the preferred choice over the general purpose lanes due to their time (cost) savings.

B. Procedures for Determining Regional Transportation-Related Emissions

The amended Final Transportation Conformity Rule §93.122 issued by EPA on July 1, 2004 contains transportation-related emissions determination procedures that must be implemented in non-attainment areas. The Baltimore region has maintained a process for a number of years that meets the modeling requirements under §93.122(b)(1)(i) through (vi) for designated severe ozone nonattainment areas. Since the revocation of the 1-hour ozone standard on June 15, 2005, the Baltimore region is no longer a severe nonattainment area for 1-hour ozone. It is now a moderate nonattainment area for the 8-hour ozone standard, a nonattainment area for PM2.5, and a maintenance area for CO. However, due to persistent air quality issues in the Baltimore region, the region still follows the same procedures and meets the requirements. BMC staff, on behalf of the BRTB, runs transportation (travel demand) modeling activities associated with conformity and mobile model changes. MDE is responsible for all emissions modeling. BMC continues to contract with various consultants to evaluate technical capabilities and suggest future work program items. This effort has enabled BMC to take advantage of national expertise in improving technical capabilities to a sophisticated level. In addition, the BMC participates in a peer review process, in which a national panel of experts reviews the region's travel demand model. Appendix G outlines how BMC addresses the requirements in §93.122(b)(1)(i) through (vi) of the Final Transportation Conformity Rule.

B.1. Adjusting Network Based Vehicle Miles of Travel

With EPA's release of MOBILE6, the Baltimore region re-evaluated the technical process used in converting travel demand modeling results into a format for mobile emissions estimates. With MOBILE5b, a post processor was necessary to combine information generated from the travel demand model with the MOBILE emissions model, since the MOBILE5b emissions model was not directly

connected to simulated transportation characteristics. EPA developed MOBILE6 to provide the connection between travel demand models and emission models using several files containing transportation characteristics (such as VMT by speed and hour of the day for each vehicle type) in estimating gram per mile emissions for mobile source pollutants, including NO_X, VOC, CO, and direct PM2.5. (MOBILE has the ability to also estimate emissions from refueling. In the Baltimore region, refueling emissions are considered a stationary source and not mobile.)

The Baltimore region is now using EPA's updated MOBILE6.2 model. For MOBILE6.2 application, a commercially-available software package (entitled PPSUITE) was used to manage the process of connecting output from the travel model to the MOBILE6.2 model used to estimate mobile emissions. The PPSUITE package takes travel demand model output and generates the needed MOBILE6.2 transportation files. It then executes MOBILE6.2, and summarizes the mobile emissions.

The following general steps summarize the mobile emission estimation process:

- ⇒ Output travel demand model estimates of daily-, a.m.-, and p.m. peak-period link totals and truck volumes
- ⇒ Convert travel demand model estimates of daily link total and truck volume to seasonal/monthly HPMS adjusted hourly estimates
- ⇒ Estimate link volume by vehicle class (motorcycle, 2 axle, bus, and 2 axle 6 tire and 3+ axles)
- ⇒ Calculate new travel speed
- ⇒ Prepare MOBILE6.2 transportation related files
- ⇒ Prepare MOBILE6.2 input scripts including transportation assumptions, environmental assumptions, control program specification files, and MOBILE6.2 operating parameters
- ⇒ Execute MOBILE6.2 estimating mobile gram per mile composite emissions for each pollutant and VMT fractional shares for 28 vehicle types
- ⇒ Apply MOBILE6.2 VMT fractional shares for 28 vehicle types by accumulated facility type VMT summaries multiplied by composite gram per mile emission factors
- ⇒ Summaries showing estimated MOBILE source emissions by 28 vehicle types for each pollutant and converted to tons per day
- ⇒ For estimates of annual PM2.5 emissions, apply weekday gram per mile emission factor to estimated monthly VMT. Sum monthly VMT for annual estimate.

A more detailed, albeit brief, explanation of the process follows below. Task Report 03-3 contains a more in-depth documentation of the process for the Baltimore region and is available upon request. (Please see Appendix A for information on obtaining this report.) EPA has posted substantial information on MOBILE6.2 on the internet for additional reference (www.epa.gov/otaq/m6.htm).

Travel information within a database format (dBase) is used in exchanging link characteristics between the travel demand modeling software TP+ and PPSUITE. Estimated link volume is adjusted using jurisdiction Highway Performance Monitoring System factors and seasonal/monthly (Table II-2) factors (1.04 percent for average summer weekday and 0.938 percent for average winter weekday) by facility type and area type. The HPMS factors are derived from the 2000 travel demand model validation. The 2000 HPMS adjustment factors used are contained in Table II-3 below. The 2000 HPMS factors are closer to one on the upper class facilities and are greater as the facility class decreases due to less representation of the highway network within the travel demand model. The travel model includes all interstates but only skeleton representation of the lower class facilities especially in the more developed counties. Factoring by the HPMS factors compensates for differences between simulated volume (from the travel model) and estimated observed volume. During the adjustment process, an estimate of local (off-network) VMT is made using the ratio of local to non-local 2000 HPMS estimates applied to the adjusted model estimates. These ratios are contained in Table II-4. These three steps, (1) applying the HPMS factors; (2) applying the seasonal/monthly factors; and (3) estimating local VMT, reconcile the

travel demand model with 2000 estimated observed volume. The HPMS and seasonal/monthly factors are also applied to horizon year estimates of VMT; thereby reconciling horizon year estimates with the ratio of unexplained volume in the base year 2000. This reconciliation ultimately allows the travel model to provide an estimate for all regional VMT.

TABLE II-2
HPMS Monthly Adjustment Factors

Month	Adjustment for 2002 PEI	Adjustment for Horizon Years
January	0.940	0.908
February	0.951	0.947
March	0.978	0.988
April	1.023	1.020
May	1.038	1.030
June	1.026	1.044
July	1.031	1.029
August	1.048	1.052
September	0.998	0.985
October	1.001	1.027
November	0.983	1.006
December	0.983	0.964

TABLE II-3
HPMS Adjustment Factors by Jurisdiction

		Interstate	Freeway	Principal Arterial	Minor Arterial	Collector
Urban	Baltimore City	1.0382	1.3342	1.2531	1.9602	2.6877
	Anne Arundel	1.0027	1.1277	1.2808	1.3454	2.0611
	Baltimore	0.9984	1.4738	1.2033	1.4748	1.5257
	Carroll	0.9793	0.9793	1.2899	1.9483	0.8083
	Harford	0.7684	1.8108	1.3834	1.3813	1.2400
	Howard	0.9452	1.2114	1.2705	1.4281	1.0509
Rural	Baltimore City	1.0382		1.2531	1.9602	2.6877
	Anne Arundel	1.0522		1.1398	0.9883	2.4571
	Baltimore	0.8695		0.9307	0.9256	1.1291
	Carroll	0.9793		0.8811	1.3678	0.9216
	Harford	0.9501		0.9170	1.2981	1.2510
	Howard	0.8405		1.5568	1.0642	1.5709

TABLE II-4
Local to Non-local Ratios by Jurisdiction

	Urban	Rural
Baltimore City	0.1087	0.1087
Anne Arundel	0.0743	0.0482
Baltimore	0.0617	0.0928
Carroll	0.0457	0.1501
Harford	0.1226	0.0831
Howard	0.0475	0.0703

Travel demand model outputs simulate volume in five time periods, while the MOBILE6.2 utilizes hourly inputs. Therefore, *vehicle type pattern files* are used to convert simulated period volume into hourly volume. The *vehicle type pattern files* are broken into four vehicle classes (motorcycle, 2-axle 4-tire, bus, and 2-axle 6-tire/3+ axle). These files are developed using two types of counts: observed counts taken hourly for all vehicles; and hourly classified counts (FHWA F-13 scheme), summarized by facility and area type (urban/rural). The counts are used to develop estimates of the share of the volume per hour. These estimates are applied against the simulated link time period volume (a.m. and p.m. peak and daily) by facility and area type.

Each link hourly vehicle type volume is compared against the modification to the Bureau of Public Roads curve used in the travel demand model. As with the travel demand model, Passenger Car Equivalence is used for the estimated truck volume. Each hourly volume is also subject to peak spreading where individual hourly volume that exceeds 30% of the maximum volume is spread to other hours within the peak period. The final estimate is a new travel time and speed estimated on each HPMS adjusted link volume considering peak spreading.

Standard MOBILE6.2 input files of VMT by facility, VMT by hour, and VMT by speed class are developed using information from the travel model and air quality post-processor. Exact description of the data estimated can be found in the User's Guide to MOBILE6.2 Mobile Source Emission Factor Model developed by EPA. The fraction of VMT for 16 vehicle types is calculated from the HPMS adjusted link volume. Using the four vehicle types and MOBILE6.2 defaults, the two-axle vehicles are divided into five classes (LDV, LDT1, LDT2, LDT3, and LDT4). Likewise, the multi-axle estimates are converted into eight heavy truck types. Motorcycle and bus volume estimated from the pattern files are in the correct vehicle type format.

PPSUITE then assembles the MOBILE6.2 scripts using information such as registration data for the Baltimore region, environmental conditions (such as temperature), control programs, and transportation information described in the above steps. National defaults are used for the more complex and data intensive inputs into MOBILE6.2. MOBILE6.2 scripts are built for each area type (urban or rural) and facility type within each jurisdiction (only for the assembly of the transportation information, since neither environmental conditions nor control programs vary across the non-attainment area).

The assembled MOBILE6.2 script is submitted to the MOBILE6.2 software, which generates the database output (ASCII database) and the report. The output gives the gram per mile emission factors for each pollutant, for each of the 28 vehicle types. The gram per mile factor is a composite factor based on the age distribution, transportation characteristics, environmental conditions, and control program applicable for that vehicle type. MOBILE6.2 generates a VMT fraction share for all 28 vehicle types based on supplied information (registration data, diesel sales fractions, and mileage accumulation rates). This

fraction share can be used to generate a composite emission factor that can be applied to the estimated VMT or can be used to convert regional VMT into an estimate of VMT for each 28 vehicle types and then factored by the gram per mile emission factor for that particular vehicle. Both methods would produce the same estimate of VMT. The later method is used in order to generate more specific reports about emissions and VMT for the region.

The final step is to accumulate the estimate of VMT and emissions for the various vehicle types and facility types.

B.2. Updates to MOBILE6.2 Modeling Assumptions

In cooperation between BMC and MDE staff, assumptions used within the MOBILE emission model are reviewed and validated with the latest information on environmental conditions and MOBILE commands representing control strategies and other policies.

The monthly analysis of mobile source emission required the development of average hourly monthly temperatures and humidity along with daily estimate of barometric pressure. The BWI weather reporting station observations were analyzed to develop the required input. The BWI weather reporting station was also the source for hour of sun rise and sun set and the percent cloud cover. Other monthly assumptions in fuel composition and volatility were estimated and or used the MOBILE6.2 default for that month.

The MOBILE script that reflects the Inspection and Maintenance program was also reviewed and compared against policies and procedures in use at various locations within the region. At the testing facilities, I/M technicians are testing OBD vehicles for gas caps starting with the 2002 model year vehicles. The MOBILE script was modified reflecting the in-place procedure. The effectiveness of the method used during the I/M test against the assumptions contained within the MOBILE script were evaluated. Changes were required to the cut point file in order to reflect procedures in place at the testing facilities.

C. ANALYSIS OF EMISSION REDUCTION STRATEGIES USED FOR CONFORMITY OF THE PLAN AND THE TIP

This section reviews the approach for technical analysis of ERSs used for conformity of the Plan and TIP. Calculations are provided in Appendix H. For conformity, ERSs are separated into three categories:

> *Implemented: Projects and strategies implemented between calendar years 2000 and 2004 that have continued, quantifiable emissions benefits.*
>
> *Programmed: Projects and strategies with allocated funding that provide emissions benefits in the TIP, Consolidated Transportation Program (state), and Capital Improvement Programs (local).*
>
> *Planned: Projects and strategies in the Plan that provide emissions benefits.*

C.1. Implemented

Since calendar year 2000, the region has implemented projects and strategies that have worked to improve transportation services, reduce congestion, and provide alternative transportation options, which result in improved air quality. These strategies are captured in this category. (All projects prior to 2000 are assumed to be in the validated 2000 travel demand model or captured in the adjustment factors using HPMS data and are therefore not captured off-model.)

Projects and strategies included in this category of ERSs can be found in the Tracking Table, contained in Appendix H. While the tracking table contains numerous ERSs, those considered "implemented" for

conformity purposes are those that are completed and continue to provide emission benefits. This Appendix also contains methodologies and calculations for all ERSs used for conformity of the 2006-2010 TIP (implemented, programmed, and planned strategies).

C.2. Programmed

Programmed projects and strategies that have emission reduction benefits may be funded primarily in two ways: with Congestion Mitigation and Air Quality (CMAQ) funds and non-CMAQ funds. CMAQ funds are provided by the federal government and specifically target air quality and congestion management endeavors. Non-CMAQ projects are those funded with non-CMAQ federal funds, state, local, or private funds. Note that quantifiable changes in mobile emissions are not provided for all CMAQ projects due either to their nature or a calculated benefit cannot be subtracted from the network based analysis that does not contain the mobile emissions prior to implementation of the project.

Programmed ERSs scheduled for funding include rideshare assistance, bus replacement, areawide congestion management, areawide CHART program, additional park-and-ride lots and/or spaces, bicycle and pedestrian improvements, and transit enhancements. Appendix H contains the air quality analysis performed for those with quantifiable benefits used for conformity. This analysis is provided to indicate what strategies the region is selecting for implementation and what one might expect in mobile source emission changes. The methodology used to evaluate these projects assumed a change in travel behavior either from a reduction in VMT and/or elimination of motor vehicle trips.

C.3. Planned (In the Plan)

Beyond programmed initiatives in the TIP, the Plan includes strategies to implement an array of emission reduction strategies. The section of the Plan that outlines transportation emission reduction strategies lists several programs, including a Commuter Assistance program, a home-based telecommuting strategy, transit intensification, development of additional park-and-ride lots, intelligent transportation system projects, and implementation of the bicycle/pedestrian element of the Plan. Newer categories include Clean Technology and Land Use/Smart Growth (although credits are not calculated for these). The Plan allocates financial resources to implement selected strategies as appropriate within the mandated fiscal constraints. These emission reduction strategies are described in more detail in the Plan. Planned strategies used for conformity credit are briefly described below.

- The Commuter Assistance program relies primarily on voluntary participation by large employers, and to a lesser degree on participation by smaller employers. The program is a regional programmatic overlay to supplement traditional commuter-related programs.
- Home-based telecommuting strategy relies primarily on voluntary participation by large employers, and to a lesser degree on participation by smaller employers. For a description of the telecommuting strategy used in this report, see Section III (for technical assumptions, methodology, and emission reduction analysis, see Appendix H).
- Build New Park-and-Ride Spaces/Lots the emission reduction credited from this strategy assumes a portion of the park-and-ride lots outlined in the Plan will be implemented by the respective horizon year.
- Bicycle Element of the Plan the emission reductions credited from this strategy assumes implementation of planned bicycle facilities in the Plan by the horizon year of 2020.

D. EMISSIONS RESULTS

D.1. Network-based/Model

Upon completion of the travel forecasting task, MDE used the MOBILE6.2 computer model, developed by EPA, to estimate the emission effects of the projected transportation system usage. Simulated VMT for an average weekday and monthly is located in Table II-5 for the baseline (2002) and horizon years 2010, 2020, and 2030.

TABLE II-5
Average Weekday and Monthly VMT
(in thousands)

	2002		2010		2020		2030	
	Monthly	**Average Weekday**	**Monthly**	**Average Weekday**	**Monthly**	**Average Weekday**	**Monthly**	**Average Weekday**
January	1,907,500	65,800	1,972,400	68,000	2,164,600	74,600	2,325,200	80,100
February	1,743,000	66,500	1,924,400	70,900	2,111,900	77,800	2,268,600	83,600
March	1,984,600	68,400	2,146,200	74,000	2,355,300	81,200	2,530,100	87,200
April	2,008,900	71,600	2,144,200	76,400	2,353,100	83,800	2,527,800	90,000
May	2,106,300	72,600	2,237,400	77,100	2,455,400	84,600	2,637,600	90,900
June	2,014,800	71,800	2,194,700	78,200	2,408,500	85,800	2,587,200	92,200
July	2,092,200	72,100	2,235,300	77,000	2,453,000	84,600	2,635,100	90,800
August	2,126,600	73,300	2,285,200	78,800	2,507,900	86,400	2,693,900	92,900
September	1,959,800	69,800	2,070,700	73,800	2,272,400	80,900	2,441,000	86,900
October	2,031,200	70,000	2,230,900	76,900	2,448,300	84,400	2,629,900	90,700
November	1,930,400	68,800	2,114,800	75,300	2,320,800	82,700	2,493,000	88,800
December	1,994,700	68,800	2,094,100	72,200	2,298,100	79,200	2,468,600	85,100
Annual	**23,900,000**	**839,500**	**25,650,300**	**898,600**	**28,149,300**	**986,000**	**30,238,000**	**1,059,200**

Emission factors utilized for the analyses were generated using the MOBILE6.2 model with Baltimore region-specific inputs. With the exception of control program descriptions and vehicle-type VMT fractions, which were varied with each evaluation year in accordance with anticipated highway vehicle emission controls and MOBILE6.2 fleet turnover projections respectively, all inputs were held constant for each horizon year modeled. Constant inputs include Baltimore region-specific light duty 2002 vehicle registration distribution and Baltimore-specific meteorology. Evaluation year-specific vehicle emissions

inspection/maintenance, vehicle tampering inspection (ATP), Heavy Duty Diesel Engine rule, evaporative emission controls (RVP and Stage II) and National Low Emission Vehicles were utilized. All year-specific inputs were based on MDE's "best estimates" of program specifications for future years. The 2002, 2010, 2020, and 2030 evaluations reflect "enhanced I/M," "enhanced ATP," gasoline volatility control at reformatted gasoline stringency (7.0 psi RVP), and Stage II refueling control. Since the emissions analyses exclude refueling emissions, the Stage II volatility control assumption has no impact on emission levels. Appendix I includes correspondence from MDE in reference to the emissions estimation process. Network-based daily emissions of direct PM2.5 and NO_X were calculated for the scenarios presented by jurisdiction area (urban/rural) and functional type basis and aggregated for a regionwide statistic. Table II-6 shows the network-based annual mobile source emissions of direct PM2.5 and NO_x.

The analysis of the implementation of the Plan and TIP, for PM2.5, was performed by comparing horizon year-specific estimates of mobile source emissions with 2002 baseline year emissions, using MOBILE6.2.

The network-based results, shown in Table II-6, indicate that mobile source emissions of direct PM2.5 and the PM2.5 precursor NO_x, associated with the implementation of projects contained in the Plan and TIP, meet the interim emissions test. Emissions associated with all horizon years under consideration are no greater than emissions from the 2002 baseline year.

TABLE II-6
Plan and TIP PM2.5 Conformity Mobile Source Emissions Results – Network Based Analysis (tons/year)

	Implementation		**2002 Baseline Emissions**		**Difference**	
	Direct PM2.5	**NO_x**	**Direct PM2.5**	**NO_x**	**Direct PM2.5**	**NO_x**
2010	563.62	30,052.81	1,043.51	63,759.38	479.89	33,706.57
2020	427.26	9,997.09	1,043.51	63,759.38	616.25	53,762.29
2030	435.04	7,015.55	1,043.51	63,759.38	608.47	56,743.83

D.2. Off-model

An off-model approach evaluating ERSs implemented, programmed, and planned is used to address projects that are not able to be modeled in the travel demand model. These projects are evaluated for emissions impacts. A model called MAQONE (Maryland Air Quality Off Network Estimator) provides results for projects where sufficient data existed, found in Appendix H. The majority of the applications of the Air Quality Off Network Estimator model (adapted for Maryland) have been used and documented in other nonattainment areas. A detailed description of the model and its methodology is available in the report *MAQONE: Maryland Air Quality Off-Network Estimator: Version 3.2 User's Guide and Reference Manual* (Michael Baker Jr. Inc., 2003).

The combination of network-based results and off-model ERSs provide the final emissions results for the selected horizon years of 2010, 2020, and 2030. These results are illustrated in Table II-7. The table contains the 2002 baseline year emissions of direct PM2.5 and NOx, estimated emissions from the network-based analysis, implemented, programmed, and planned ERSs, and the final comparison of

mobile emissions associated with implementation compared with the 2002 baseline year emissions. The implementation total is estimated by adding together the network and off-network emission estimates. The PM2.5 conformity determination is based upon the comparison of the implementation to the 2002 baseline year emissions. This is the interim emissions test.

TABLE II-7
Final Emissions Results
(tons/year)

			2010 Emissions		2020 Emissions		2030 Emissions	
			Direct PM2.5	NO_x	Direct PM2.5	NO_x	Direct PM2.5	NO_x
2002 Baseline Year Emissions			1,043.51	63,759.38	1,043.51	63,759.38	1,043.51	63,759.38
NETWORK BASED ANALYSIS			563.62	30,052.81	427.26	9,997.09	435.04	7,015.55
Emission Reduction Strategies	IMPLEMENTED		-0.90	-172.98	-0.90	-154.22	-0.09	-0.60
	PROGRAMMED - TIP, CTP, & CIP	Rideshare	-0.29	-10.11	-0.28	-3.77	-0.28	-2.93
		Bus Replacement		-99.57		-106.61		0.00
		CHART (Areawide Congestion Management)		-72.23				
		Pathways/Bicycle trails	0.00	0.00	0.00	-0.20	0.00	-0.31
		Sidewalks/Pedestrian Improvements	0.00	-0.10	0.00	0.00	0.00	0.00
		Park-&-Ride Programmed	-0.01	-0.37	-0.01	-0.14	-0.10	-0.11
		Transit Enhancements	0.00	-0.01	0.00	0.00	0.00	0.00
		Arterial Improvements (System Signalization)						
	PLANNED	Regional Commuter Assistance	See qualitative description of planned emission reduction strategies in Appendix H. The methodology for determining emission reductions is currently being reviewed. As a result, no credit has been taken in this conformity analysis for these emission reduction strategies.					
		Home-Based Telecommuting						
		Planned Park-&-Ride lots						
		Bicycle Element of the Plan						
	Off-Network Analysis Total		-1.20	-355.37	-1.19	-264.94	-0.47	-3.95
IMPLEMENTATION TOTAL			562.42	29,697.44	426.07	9,732.15	434.57	7,011.60
2002 Baseline vs. Implementation			-481.09	-34,061.94	-617.44	-54,027.23	-608.94	-56,747.78

III. STATUS REPORT ON IMPLEMENTATION OF EMISSIONS REDUCTION STRATEGIES IN THE BALTIMORE REGION

The Clean Air Act Amendments of 1990 require metropolitan areas in nonattainment of the NAAQS to submit evidence of expeditious implementation of ERSs as an attachment to the TIP. Since the Baltimore region has been classified a nonattainment area for PM2.5, a moderate nonattainment area for 8-hour ozone and a severe nonattainment area for 1-hour ozone, this section provides descriptions of the various strategies used in the Baltimore region and the status of implementation of those strategies. This section also serves as a tracking mechanism for assessing the progress of effectively implementing ERSs in the Baltimore region.

For simplicity, this section reviews the various strategies in the Baltimore region by category. The categories are Commuter Choice Activities, Employer-Based Programs, Improved Public Transit, Park-and-Ride Programs/Lots, ITS Projects, Bicycle/Pedestrian Activities, Parking Management, and Clean and Efficient Strategies. These categories are used for organizational purposes and do not relate directly to any particular legislative or funding areas.

MDE has submitted numerous SIP revisions to the EPA that have included aggressive and cost effective ozone control strategies and air quality modeling demonstrations to help the Baltimore region achieve clean air goals for the 1-hour ozone standard. A general conformity SIP revision and transportation conformity SIP revision have also been submitted to EPA. MDE is now in the process of preparing SIPs to meet the new 8-hour ozone and PM2.5 standards. These plans will likely include additional emission control measures that will be implemented within the 2010 timeframe.

A. COMMUTER CHOICE ACTIVITIES

A.1. Rideshare Program

The Baltimore region's original rideshare program began in 1974 as a joint effort of Baltimore City, the Regional Planning Council (now the Baltimore Metropolitan Council), and MDOT. Efforts to encourage ridesharing were expanded to cover the entire state in 1978 when the Maryland Ridesharing Office of the Maryland Transit Administration was established. Since it was formed, the MTA has enhanced and expanded its activities to include both commuters and their employers. A continuing program administered by the MTA provides funding support to local rideshare coordinators in order to strengthen ridematching and rideshare-support services at the jurisdictional level. The BMC provides ridesharing coordination services for Baltimore and Carroll Counties. Local rideshare coordinators have provided ridesharing information that has helped in the development of more effective regional emission reduction strategies. They have also assisted employers and employees in identifying opportunities for other ERSs such as transit, flexible work hours, and telecommuting.

The MTA and local rideshare coordinators are continuing to conduct annual surveys, seminars, and workshops to determine employer and employee attitudes toward alternative commute strategies. They have distributed rideshare information in printed and electronic formats to both public and private employers, and have placed rideshare advertisements in daily and weekly newspapers and regional magazines. Radio and television commercials have been used to encourage ridesharing. They have assisted in promoting Clean Commute Month and increased use of the MTA Commuter Choice discount transit fare program. Rideshare coordinators have also assisted with the establishment of new commuter shuttles and routes. In addition to printed maps showing local Park-&-Ride lots published by individual jurisdictions, an updated electronic map of the 100+ Park-&-Ride lots throughout the Baltimore region is available on the BMC website.

The Howard County "Commuter Solutions" program is an example of a local ridesharing service. This locally operated program includes arranging free car- and van-pool matching for commuters traveling into and out of Howard County. They also monitor parking availability and other conditions at park-and-ride lots, and provide service and schedule information for local and commuter transit options including MARC and MTA services.

A.2. Maryland Commuter Tax Credit

As of January 2000, a tax credit went into effect statewide that allows employers to claim a 50% state tax credit for providing transit benefits (subsidy) to an employee of up to $50 per month, which an employer may provide to an employee without tax consequences under the Federal tax law. It is expected that the state benefit will be even more attractive to employers as a benefit to offer employees than the Federal law (a direct tax credit as opposed to an allowable business expense). This feature of the Maryland law also has the potential to encourage increased transit use by low and moderate-income employees. Under provisions of both the 1999 and 2000 Maryland laws, private non-profit organizations will also be able to participate in the program. Employers will be able to claim tax credits for providing transit passes and vouchers, guaranteed ride home, and parking cash-out programs. Similar to the IRS benefits, the Maryland Commuter Tax Benefit program does not provide financial assistance to carpoolers. Information is also provided online and employers are able to register to participate in the program over the internet.

A.3. Other

Clean Commute Month

For many years, the BRTB has teamed with state transportation and air quality agencies as well as private organizations to promote Clean Commute Week. The program has now been greatly expanded and is now known as Clean Commute Month. For Clean Commute Month, citizens in the Baltimore region are asked to try an alternative commute option at least one day during the month-long period. Clean Commute Month was promoted again in 2005, from May 1-31. To kick off CCM 2005, bicycle commuters and other bicycle enthusiasts met to celebrate Bike-to-Work Day. Participation in Bike-to-Work Day has increased substantially in recent years, and many local businesses and organizations donated prizes for participants. Bike-to-Work Day has truly become a region wide initiative, with rallies in Annapolis, Baltimore City, Baltimore County, and Harford County. CCM 2005 included a coordinated media campaign, with radio spots running several weeks before the event. In addition, a web site, **www.cleancommute.com**, provides information about Clean Commute Month, Bike-to-Work Day, and other commuting issues. The site remains live year-round and is a "one-stop-shop" for clean commuting information in the Baltimore region. The site also highlights employers who promote clean commuting and hosts information on commuter tax benefits. It is expected that these types of activities will lead to ongoing use of alternative transportation choices.

B. EMPLOYER-BASED PROGRAMS

Employer-based ERS programs include alternate commute options such as telecommuting, regional commuter assistance, flexible work arrangements, and guaranteed ride home. Employer outreach efforts by the BRTB, MDE, MDOT, MTA, and other organizations are focused on encouraging voluntary participation in more employer-friendly and employee-friendly ERS measures.

Other activities related to voluntary employer-based programs are underway in the Baltimore region, including a number of public sector employers such as Baltimore County, Carroll County and the BMC that have initiated pilot programs of flexible work arrangements.

B.1. Telecommuting

Home-based telecommuting is a voluntary region-wide strategy for reducing Single Occupant Vehicle use by employees who work for large and small organizations.

In September 1999, BMC completed its first telecommuting baseline study for the Baltimore region. This study surveyed employees and employers (both large and small) to determine the current level of telecommuting activity in the region, and to document employer attitudes and expectations which will affect future telecommuting growth in the region. The study found that 3.6 percent of employees in the region (approximately 50,000 employees) telecommute (primarily from home). This magnitude of telecommuting is almost double the level previously used in air quality analysis. This study also documented employer interest in participating in voluntary employer-based programs such as MDOT's Telework Partnership with Employers program. The study, which was one of the first of its type in the U.S., was selected for presentation at the 2001 annual conference of the Transportation Research Board.

At the direction of the General Assembly, MDOT has implemented a telecommuting program for its employees. The General Assembly passed legislation establishing pilot telecommuting programs for state employees. The goal of this program is to recruit 10% of eligible state employees as telecommuters.

Telework Partnership with Employers

BMC and MWCOG are now participating in a bi-regional program to assist large and small employers to establish home-based telecommuting programs for their employees. This program, known as the "Telework Partnership with Employers," is sponsored and funded by the MDOT. In addition to the traffic and emission reduction benefits of the TPE program, it will assist in perfecting marketing, outreach procedures, and administrative methods that may be used in other alternate commute programs.

Since its kickoff in October 1999, over 25 large and small private sector employers as well as two non-profit organizations have been recruited to participate in the bi-regional TPE program. In the Baltimore region, eight employers have begun telecommuting programs and two more are initiating consultant services. Employers have been recruited through a series of TPE outreach events. Employers that have signed up to participate in year-long pilot telecommuting programs can choose from a list of qualified regional and national telecommuting consultants whose services are paid for by MDOT.

B.2. Guaranteed Ride Home Program

The first Guaranteed Ride Home program in the Baltimore region was initiated by the BWI Business Partnership. This program encourages ridesharing among the member employers of the BWI Business Partnership. Individuals that drive to work only one or two days per week are eligible to participate in the program. If an emergency occurs or an employee needs to work late, the GRH program provides a ride home at no cost to the registered participant. This GRH program has been well received by both employers and employees. Initially, over 500 employees registered for the service.

Information from the post-demonstration assessment of this program has been used by the BMC to estimate the emission reduction potential of other GRH programs and related emission reduction strategies in the Baltimore region. Based on the results of this assessment and further survey data, the BMC assisted the Annapolis Regional Transportation Management Association in establishing a Guaranteed Ride Home program.

B.3. Commuter Choice

In support of voluntary employer-based programs, the MTA has developed a reduced fare program known as Commuter Choice. This MTA program, which was previously known as TransitPlus and TransitPlus 2000, permits participating employees and employers to receive increased federal tax benefits along with reduced transit fares and reduced vanpool commute costs. Specifically, employees can save

up to 42% of their annual commuting cost by purchasing Commuter Choice monthly passes with pre-tax dollars. Employers benefit by saving approximately 10% on payroll taxes. During the 1999 session, the Maryland General Assembly passed legislation (SB 390 and HB 636) which made state tax reductions available to employers that provide commuter benefits such as Commuter Choice to their employees. The availability of federal and state tax benefits, combined with aggressive marketing, are expected to substantially increase employee participation in the Commuter Choice program and other qualifying commute options. MTA seeks to enroll at least two new employers each month in its Commuter Choice program.

C. IMPROVED PUBLIC TRANSIT

The Baltimore region is served by an array of bus and rail transportation services. This section addresses both bus and rail transportation in the Baltimore region.

C.1. Bus

The MTA operates a far-reaching system of bus services. Currently, there are 49 "core" bus lines serving Baltimore City as well as Anne Arundel and Baltimore counties. The majority of these routes serve areas within the Baltimore beltway, connecting regional suburbs to downtown, and neighborhoods within the downtown area. Fourteen routes are feeders into Light Rail, Metro Subway, and MARC stations.

The size of MTA's bus fleet is approximately 756 buses, with ongoing replacement programs to ensure the safety, emission reduction, and reliability of the fleet. In its short-term transit improvement program, MTA is considering a number of innovative service options, including neighborhood transit routes using smaller buses, circumferential services linking suburban activity centers, transit centers, and reverse commute service aimed at providing access to suburban employment opportunities.

Commuter bus service is provided on 22 lines, which operate throughout the state, 7 of which operate in the Baltimore region. Private contract service providers under the Maryland Private Commuter Bus program provide these important peak period commuter services to MTA.

The MTA also operates local, neighborhood shuttles within the Baltimore region. The neighborhood shuttle program has been very well received. Its first route, the Hampden Shuttle Bug, began service in December 2000 and draws about 500 riders per day. Another neighborhood shuttle service, the Mondawmin Shuttle Bug, was started in 2002. The MTA also maintains a program of enhancements to the bus system, including rehabilitation of park-and-ride lots and other selected facilities. MTA and other local bus systems, such as Annapolis Transit, Harford Transit, and Howard Transit, have an ongoing vehicle replacement program aimed at acquiring more efficient, lift-equipped buses.

The MTA is working to develop a system-wide bus master plan that presents a sequence of bus projects that can be phased over time that will lead to a more efficient and safer operating environment for the mode. The Master Plan will examine previous facility plans, existing bus facilities, projected operations, new technologies, worker safety, and ridership demand to develop recommended capital projects for rehabilitation and improvements to bus facilities to meet future needs. The master plan is intended to serve as a guide to promote a logical progression in programming, planning, and completing projects within the context of a system-wide approach to managing improvements to bus facilities over a ten to twenty year time horizon. The total amount budgeted for the study is $400,000 state funds and it is expected to be completed in the fall of 2005.

In 2005, the purchase of 10 hybrid electric buses, which would be used as part of the MTA fleet, was approved by MDOT. Not only do hybrid electric buses have better fuel efficiency than conventional diesel buses, they produce fewer pollutants. In addition, MDE and MTA are proposing a pilot project that would involve the installation of Clever Devices BusLink Switches on 100 MTA buses, between October

1, 2005 and October 1, 2006. The BusLink Switches activate an auxiliary heater that heats the coolant in the engine, thereby eliminating the need to idle the buses in the mornings to maintain an adequate operating temperature. MTA will have the ability to remotely operate the BusLink switches from the bus depot.

Job Access and Reverse Commute (JARC) Services

MTA is continuing its efforts to identify cost effective opportunities to expand its Job Access and Reverse Commute program. This program provides transit-dependent residents with transportation to jobs in areas that are not conveniently served by existing MTA transit routes. Since 2000, MDOT has been receiving funding from the FTA, the State, local jurisdictions, and non-profit organizations to provide transit services. The Baltimore region received over $9.3 million in federal funds in total for FY 2004 and 2005, for the region's JARC programs. New JARC initiatives in the Baltimore region include fixed-route bus service; ride brokering, and employee shuttle services for interviews, job fairs, and daily commutes. Some of the most recently funded locally operated fixed-route services are Annapolis Transit Gold Route Extension/Late Night GR Service, Howard Transit Career caravan and Red Express, Corridor Transportation Corporation's (CTC) West Anne Arundel County service and Sojourner Douglass College WTRC. The bus routes connect with MTA services, and were designed to provide Baltimore's low-income workers access to job sites in outlying suburban areas.

The feature of the JARC Program that encourages collaboration has been valuable to the State's coordination efforts. The MTA works closely with the Maryland Department of Human Resources (DHR) on the State's JARC Program. DHR administers the State's Temporary Assistance for Needy Families (TANF) funds, and has provided over $10.6 million in matching funding both directly from the State level and through local Departments of Social Services.

To ensure continuation of the program independent of federal reauthorization issues, in April 2001 the Maryland General Assembly established a Job Access Program within the MDOT budget. This legislation outlined the application procedures and established local matching fund requirements of at least 25% for proposed operating projects and at least 20% of the total cost for proposed capital expenditures.

MTA's JARC Program has been recognized nationally. In July 2002, information on the State's program was presented to the U.S. Senate Committee on Banking, Housing and Urban Affairs, and the Community Transportation Association of America highlighted Maryland's JARC program on their web site and in their magazine focusing on employment transportation.

The program was also a major factor in Maryland being recognized by the federal government with a *United We Ride State Leadership Award* during the recent *National Leadership Forum on Human Service Transportation*, part of a new initiative to improve the coordination of federally supported transportation services.

Greyhound Bus Service

The Greyhound bus station on West Fayette Street was relocated to an interim facility near Russell Street until an adjacent intermodal transportation center (which is in planning stages) is completed in 2007. The new intermodal center will be a 15,000 square foot facility located at 2110 Haines Street in the Carroll Camden Industrial Park. The cost is projected to be $2.1 million. The facility will provide a convenient link between intercity and local public transportation.

Changes on an existing MTA bus route that will provide scheduled bus service to the new temporary Greyhound bus facility in the Camden Industrial Park were introduced in July 2004. The MTA's #27 bus line has been modified to serve the temporary station.

Locally Operated Transit Systems

In addition to the transit services operated by MTA, four public transit systems are operated locally in the Baltimore region. These systems, Annapolis Transit, Carroll Transit System, Harford Transit, and Howard Transit, provide bus and paratransit services primarily within the local areas in which they operate. Locally operated transit systems are funded through a combination of federal, state, and local dollars. MTA provides financial, technical, and operating support for these services. MTA passes are accepted for these bus services, except Carroll County services which do not connect with MTA routes.

Annapolis Transit is a bus service operated by the Annapolis Department of Transportation. Carrying customers every day except major holidays, its routes serve the City of Annapolis and nearby portions of Anne Arundel County, including Parole, Edgewater, Shady Side, Deale, Galesville and Arnold. A weekday commuter shuttle also links Annapolis with Kent Island. Two free routes circulate between the park and ride lot at the Navy-Marine Corps Memorial Stadium and downtown Annapolis and West Annapolis. Base fare is only $.75.

Some routes connect with MTA's local bus service, which provide access to Baltimore and Light Rail, and commuter bus service to Washington, New Carrollton and Bethesda. The City of Annapolis' Transit Operations Facility also serves as a station for Greyhound/Trailways inter-urban service. Additional bus services are provided for special events. New lighted shelters are located at many of the over 200 bus stops. Buses, raised-roof vans and one of the three trolleys are wheelchair accessible. All vehicles except for trolleys are equipped with bike racks.

Carroll County provides local paratransit service through a contract with an operator known as Carroll Area Transit System. CATS is a private, non-profit corporation with a primary mission of providing efficient, safe, and demand-responsive transportation to older adults, persons with disabilities, emotionally disadvantaged, and transportation-disadvantaged citizens of Carroll County. CATS's fares are $2.00 every 5 miles for general transportation. For seniors going to senior centers, the fare is $1.00 each way. For the Westminster Shopper Shuttle and the South Carroll Shuttle, the fare is $1.00 each way. The Westminster/Eldersburg Shuttle, $2.00 each way.

The demand-response transportation is available to seniors and the disabled population on a primary-service basis and to the general population on a space-available basis. Demand-response service provides door-to-door service for all passengers. The system operates Monday through Friday from 7 a.m. to 5 p.m. Sunday service is provided in the Westminster area on a limited basis for individuals needing transportation to churches in the Westminster area. Persons requiring transportation are requested to call 24 hours in advance to schedule their rides.

Harford Transit, formerly Harford County Transportation Service before August 2004, provides fixed-route and demand-response bus services to the general public and the elderly and disabled populations of Harford County. Nine local routes link the primary towns and connect with MARC commuter train, and MTA's commuter bus service to downtown Baltimore. The fare structure for Harford Transit fixed routes is: $0.50 for seniors and Handicapped Persons, $1.00 for the General Public. The hours of operation for the local fixed routes varies, the first starting at 5:34 AM and ending at 6:39 PM Monday thru Friday except for County observed Holidays. There is one long-distance Job Access fixed-route reverse commute from Baltimore City to employment centers in Harford County along the I-95/US 40 corridor.

The demand response bus service works on a call and prescription service, persons requesting a ride need to call no later than 48 hours in advance. The charge for demand response is $2.00 each way except for persons going to Senior Centers who are charged $1.00 each way.

Howard Transit, formerly Howard Area Transit Service, is the general public transportation service for Howard County. Howard Transit provides eight fixed-routes serving Columbia and surrounding areas including Clarksville, Ellicott City, Elkridge, Jessup, Laurel and BWI International Airport with connections to MTA bus, MARC, and Light Rail. The base fare is $1.50 each way. Reduced fares are available for senior citizens, students and individuals with disabilities. A liberal transfer policy is available and multi-ride passes are offered.

There are two transit services in the region operated by nonprofit corporations. They are Connect-A-Ride, and The Link. Both initiatives grew out of a need to provide affordable and efficient connections to places of employment. Connect-A-Ride is funded through a combination of private, federal, state, and local dollars. Employers in the service area fund the Link services. For more information visit Howard Transit at **www.howardtransit.com**.

Corridor Transit Corporation operates Connect-A-Ride, is the transit manager for Howard Transit, and provides limited service to Anne Arundel County. Connect-A-Ride, through its 12 routes, serves the Laurel area of Prince Georges County but also provides service in Western Anne Arundel County and connects with Washington Metropolitan area transit services and destinations. In the Baltimore region, it provides service to Columbia, Glen Burnie and Odenton, with connections to MTA bus, Light Rail, and MARC service. Connect-A-Ride honors MTA passes.

The BWI Business Partnership, Inc., a non-profit economic development and transportation management association, manages a bus route called The Link. The Link shuttle bus connects MTA's BWI Business District Light Rail station with BWI MARC/Amtrak Rail station, with continuing service to the National Security Agency's office location. With five different stops, the service makes 19 to 20 rounds a day utilizing two vehicles. Service hours are Monday through Friday, from 5:45 am to 5:55 pm.

Bus Replacement

MTA Fleet: MDOT has included in its Consolidated Transportation Program the funds to purchase 100 buses in FY 2003, 100 buses in FY 2004, 125 buses in FY 2005, 105 buses in FY 2006 and 100 buses in FY 2007. The new buses will replace older units in the fleet that have exceeded their useful service life, and which also have much higher levels of NO_x emissions. This replacement program will serve to reduce the average age of the bus fleet from nine to six years.

MTA also used CMAQ funds to purchase a portion of the transit vehicles to retire 68 1982/83 model year vehicles. In addition, funds were spent to upgrade bus engines of approximately 175 buses per year, which decreases particulate matter. This program will continue until all 1992 and earlier engines have been replaced or the last of the buses have been retired. As of Fall 2004, 21 engines remain to be upgraded.

Local Fleet: MTA also provides funds to local transit systems to replace older vehicles. In FY 2002, 3 new buses were purchased for Harford County and another 3 for Howard County. Harford County received MTA funding for 6 new vehicles in FY 2003 and 3 more in FY 2004. Carroll County received 3 buses in FY 2003 and 1bus in FY 2004. Annapolis Transit received 2 buses in FY 2003 and 1 bus in FY 2004.

C.2. Rail

Metro Subway

MTA's Metro Subway system provides high-speed heavy rail transit service in a 15.5-mile corridor, with 14 stations from Owings Mills in western Baltimore County through downtown Baltimore to Johns Hopkins Hospital east of downtown. Connecting bus service is provided with MTA bus routes. Free parking is available at Metro stations at Owings Mills, Mondawmin, and all stations in between.

Light Rail

MTA's Central Light Rail Transit provides medium-speed transit service in a 30-mile north-south corridor from Baltimore County to Anne Arundel County. The main line runs between Hunt Valley and Glen Burnie with recent extensions to Penn Station north of downtown Baltimore and to Baltimore/Washington International Airport (BWI) in Anne Arundel County. In 1992, MTA opened the first and second sections of the Central Light Rail system through Baltimore, and the final extensions of the system to Hunt Valley, BWI Airport, and Penn Station were opened in 1997. Light Rail serves the area by linking communities in the northern and southern suburbs with the downtown core, and provides Baltimore City residents access to suburban job centers, such as those located at the BWI Airport, the BWI Business District, and the Hunt Valley office park. Service runs every day of the week. There are 32 Light Rail stations, and parking is provided at 12 of these stations totaling 3,200 parking spaces. Parking is free. Two stations have designated overnight parking areas to accommodate travelers to BWI Airport and Penn Station.

Construction on the MTA's Light Rail Double Track Project is currently underway. The Light Rail Double Track Project includes 9.4 miles of the existing rail line, therefore making service along the line more reliable and help increase ridership. Only 2.6 miles will remain single track, due to right-of-way issues. Service from Camden Yards to North Linthicum re-opened on June 27, 2004. The remainder of the southern alignment reopened in December 2004. Construction to add the second set of tracks on the single-track sections of the northern alignment began in January 2005. Shuttle bus service is in place for customers during the service outage. The northern alignment will be reopened in early 2006.

Maryland Rail Commuter (MARC)

MTA's Maryland Rail Commuter (MARC) service provides high-speed, medium frequency commuter rail service in the Baltimore region and beyond. The 202-mile system is a commuting option for residents of Central and Northeast Maryland, the Baltimore/Washington Corridor, and the Martinsburg, West Virginia/Washington corridor. In the Baltimore region, MARC trains operate in two existing rail corridors totaling 112 miles with stations in all jurisdictions except Carroll County. The Penn Line runs between Perryville in Cecil County and Union Station in Washington D.C., and stops at 9 stations in the region. The Camden Line runs from Camden Station in Baltimore City to Union Station, and stops at 6 stations in the region. MARC passengers are able to make free transfers to other transit services operated by the MTA. Parking is available at most MARC stations; some at no cost.

MARC commuter rail services have been enhanced through construction activities at several locations throughout the region. On the MARC Penn Line, a 1,360 space parking deck was opened at the BWI Airport Station in June 1996 and 700 additional parking spaces were later opened at the Odenton Station. A feasibility study is underway for a structured parking (garage or parking deck) at Odenton Station for 2500 spaces on MTA owned property. Expansion of the Halethorpe MARC Station Park-&-Ride lot – Phase I, is complete with 428 parking spaces added. The scope of the work includes high level platforms, new shelters, and improved accessibility for persons with disabilities, lighting and streetscaping. Phase II, which includes a pedestrian bridge and high level platforms is in the project initiation stage.

In September 2005, construction began on a parking lot expansion at the Martin State Airport MARC station, located on the Penn Line. This expansion will increase the number of parking spaces from 171 to 326.

MARC operates on tracks owed by CSX and Amtrak. CSX Transportation owns the Camden line between Washington and Baltimore, and the Brunswick line between Washington and Martinsburg, while Amtrak owns the Penn line which operates between Washington and Perryville in Cecil County. MARC service on the Camden line has been negatively affected by unexpected increases in freight traffic since CSX took over part of CONRAIL in June 1999. MTA recently completed negotiations with CSX Transportation in efforts to ensure acceptable levels of commuter rail service. Through operational agreement with CSX and Amtrak, an ongoing program of improvements is underway to ensure safety and quality of service to riders. Maryland invested $30 million in state and federal money for track and signal improvements.

C.3. Other (bus and rail)

The MTA is continuously striving to provide improved services to support the stated goals of: commerce, health and the environment, education, public safety and fiscal responsibility. System/service expansion, system/service operational improvements, and inducements to potential transit users are three main components of the additional efforts implemented by MTA to provide a safe, reliable and efficient network of transit services to the citizens of Maryland. Each of these areas targets different aspects of the transit system, and most importantly, different areas that can be targeted to improve the system and increase ridership. The types of issues under each category are as follows:

- System/service expansion: New rail service, expanded bus service, express bus service.
- System/service operational improvements: Geographic coverage, scheduling changes, facilitating/eliminating transfers (i.e., car/transit, pedestrian/transit), reliability (including maintenance).
- Inducements to potential transit users: Improvements in fare structure/policies, marketing programs, passenger amenities (aesthetics, comfort, etc.), fare simplification, customer service, marketing.

Text in each of these sections addresses the types of issues under each category. (For more information, please see EPA's Transportation Control Measures Program Information Directory.)

System/service Expansion

MTA began its first neighborhood shuttle route, the Hampden Shuttle Bug, in December 2000. Currently, it draws about 500 riders per day. The shuttle operates seven days a week on 17-minute headways and costs $1.00 per ride. The program has been very well received. Small 30-foot low-floor buses are used. The Mondawmin Metro Shuttle Bug was started in 2002. It runs seven days a week and costs $1.00 per ride.

FY 2005, grant funding was approved for 24 new vehicles (mini-vans, vans, and small buses) that will be used by non-profit organizations in Maryland. Out of these, five of the vehicles are awarded to organizations in the Baltimore region that transport disabled and elderly citizens. The fund is available through the FTA Section 5310 Grant program, which provides qualified, private, non-profit organizations with small transport vehicles and equipment.

MTA's Mobility paratransit program operates 214 vehicles, which consist of 112 buses and 102 sedans to provide more capacity and flexibility in meeting peak demand, improving reliability and on-time performance. All of the vehicles have smart card technology, two-way radios and Automatic Vehicle Location (AVL) system. On July 1, 2004, MV Transportation, a nation-widen paratransit provider, officially joined the MTA in providing paratransit service for customers in Baltimore City and selected areas of Baltimore and Anne Arundel counties. MV Transportation will provide one half of the contracted portion of the Mobility service. Yellow/Connex will continue to provide the other half of the contracted portion of the Mobility service as MTA continues to implement its new service model.

The new Service Model was designed to improve MTA's ability to provide reliable, on-time service. Under the new Model, all trips will be scheduled and dispatched by MTA. All new vehicles will be identified with the MTA logos. All drivers will be in uniform. All vehicles will be equipped with a global positioning device allowing the MTA to know exactly where each vehicle is at all times.

In addition, MTA Mobility has launched a new pilot program to improve individual transportation needs and provide quicker and more reliable service. The new Premium Service pilot Program will provide service to MTA Mobility eligible patrons. This is a new program that will deliver prompt and efficient taxi service. Customers can be transported, anytime, in the MTA Mobility service area for $3.00 per trip by presenting the Taxi Access Card. Taxi Access trips will serve the present MTA Mobility service areas in the Greater Baltimore Metropolitan area.

System/service Operational Improvements

MARC Camden line schedule was adjusted to improve on-time performance. The new schedules avoid as much as possible two MARC trains meeting each other where freight congestion tends to be heaviest, including the area between Dorsey and Camden station. The new schedules will reduce delays in these areas when freight trains are using one of the two main line tracks. In addition, the new Camden line schedule is designed to improve the reliability of the first morning arrival in Baltimore.

MTA has several renovation and enhancement projects planned for the Metro Subway system. In 2000, a $34 million system-wide project was launched to rehabilitate all of the 81 escalator units in the Metro system to improve safety features. Regular wear and weather had damaged many of the escalators. The rehabilitation is expected to decrease, if not eliminate, the frequency of escalator breakdown. Project completion is expected by Fall 2007. In the interim, a user-friendly "Metro Guy" character/sign will help users navigate through construction areas. The Metro Railcar Midlife Overhaul is underway with100 cars manufactured between 1982 and 1986 to be overhauled. Overhaul of 20 married pairs (40 railcars) is completed. Project will be completed in 2005. Construction of a Metro Maintenance Facility directly adjacent to the Existing Old court road Metro Facility is underway. The completion date for this $10 million project is April 2005.

An Automatic Vehicle Location system, being implemented by MTA, will permit better management of transit operations and will assist in improving service. Dispatchers are able to detect the location of buses, monitor on-time performance, and direct service changes to make buses more responsive to changing local traffic conditions. As of July 2004, 442 buses and 35 Light Rail vehicles have been equipped with AVL equipment. Two hundred forty additional buses will be equipped by July 2005 and the remaining buses will be equipped by July 2006. This equipment is also being installed on all new buses and light railcars purchased by MTA.

In 2002, Howard Transit added AVL technology to their fleet of buses to provide better quality service for Howard County's local bus system. It includes the capability for riders to view transit maps and vehicle movement through wireless Internet hardware such as computers and palm pilots, and to receive related information on digital cellular phones with text messaging.

Inducements to Potential Transit Users

In 1999, MTA introduced a new College Pass program that reduced the cost of a regular monthly pass to $39 for college students whose schools were enrolled in the program. The program was aggressively marketed, and results were immediate. There are 22 schools in the Baltimore area currently enrolled; sales continue to rise at a rapid rate as more students become aware of the program.

MTA has been effectively marketing its transit services to tourists. Since 1995, the agency has distributed its "Visitors Ride Guide" system map and schedules at several welcome center information racks around Baltimore and the state of Maryland. Over 30,000 brochures are distributed every month. Every year, they have seen an increase in the number of hits and amount of time visitors spends on MTA screens. The MTA customer service transit information center is being upgraded by adding telephone capabilities, incorporating MARC and Mobility information, integrating AVL to provide real-time travel information, and providing additional kiosks with schedule information.

Features have recently been added to MTA's web site. MTA has launched the MTA On-Line Transit Pass Store. Through MTA's web site, a variety of transit passes can be purchased online, including Metro Subway, Light Rail and Commuter Express Monthly and ten-trip passes. There is also a new email service that sends notice to registered customers about disruptions on bus or train lines. E-mails may also include announcements for public meetings, hearings, and other events. In addition, the service provides a method for riders to register complaints, concerns, and comments immediately. It is anticipated that this mechanism may also provide a means to distribute surveys.

MTA continues to air its talk show "In Touch With the MTA." The show, launched in February 1999, is viewed in more than a million homes in Maryland. The 30-minute talk show addresses transit and transit-related information as well as "behind the scenes" issues and interviews. MTA addresses similar issues on its radio show "This Week With the MTA."

For rider convenience, ATM machines (Chevy Chase Bank) have been installed at three Metro stations. The machines include an extra feature to dispense bills as low as five dollars.

During the next two years the MTA will be moving forward with some exciting projects. The hope is that these projects will achieve the goal of improved services to the transit community.

The top projects are:

1. Implement Transportation Security System components by October of 2006.
2. Complete Light Rail improvements.
3. Paratransit - Renew MTA's commitment to its Mobility Customers.
4. Complete Bus Operational Analysis & Service Planning Study and implement service adjustments to the MTA Service areas along with replacing MTA Bus Stop Signs.
5. Introduce new MTA neighborhood (20-Foot) shuttles.
6. Complete Study for Red & Green Lines.
7. Implement Southern Maryland Commuter Bus Initiative.
8. Introduction of Dedicated Bus lanes.
9. Study and Implement a Comprehensive BRT System including integration of BRT into the ICC.
10. Reroute or revise train service on MARC, PENN or Camden lines so that trains run every 20 to 30 minutes in peak hours. (Shuttle Bus Option)
11. Institute a Performance Management Program.

D. PARK-&-RIDE PROGRAMS/LOTS

The BMC completed the first comprehensive study of Park-&-Ride facilities in the Baltimore region in June 2002. This study quantified the utilization of the 105 lots throughout the region, and documented the travel behavior characteristics of lot users, including mode of travel as well as travel origins and destinations. The study also defined the service areas of individual lots. Information gathered in the study has permitted the BMC to more accurately estimate the emission reduction potential of existing and planned Park-&-Ride facilities. Information from this study has also been used to further quantify elements of the regional travel demand model, and to assist in planning future Park-&-Ride lots.

D.1. State/Federal-funded

Expansion of the Halethorpe MARC Station Park-&-Ride lot (Phase I) is complete with 428 parking spaces added. The scope of the proposed work included high level platforms, new shelters, improved accessibility for persons with disabilities, lighting and streetscaping. Phase II, which includes a pedestrian bridge and high level platforms, is in the project initiation stage.

Construction of a new 300-space Park-&-Ride facility at the Cold Spring Lane Light Rail Station is delayed. Negotiation is underway for property acquisition.

Project planning activities are underway for expansion of parking at the Odenton MARC station to construct a 700-space parking lot with pedestrian access under MD 175 to the station platform. A feasibility study is also underway for a structured parking (garage or parking deck) for 2500 spaces on MTA owned property.

MTA is preparing conceptual plans, cost estimates, and environmental documentation for the expansion of parking from 96 to 221 at the Falls Road Light Rail station.

Harford County added a new lot at I-95 and Old Philadelphia Road, as well as one in Havre de Grace at Juanita and Otsego Roads.

D.2. Local

	Local	SHA	MTA	Private	Other
Anne Arundel County	3	9	7	2	6
Baltimore City	2		6	1	2
Baltimore County	5	10	13	1	2
Carroll County		6			1
Harford County	5	6		1	11
Howard County	1	9	3	1	1

E. INTELLIGENT TRANSPORTATION SYSTEM PROJECTS

E.1. Traffic Flow Improvements (CHART)

The Coordinated Highways Action Response Team program, operated by MDOT and Maryland State Police, focuses its operations on non-recurring congestion, such as crashes. The Statewide Operations Center, and the three satellite Operations Centers in the region, survey the state's roadways to quickly identify incidents. CHART also includes traffic patrols, which have been operating during peak periods

on many of the state highways in the region since the early 1990s. Based on 2002 data, it has been estimated that CHART operations saved 29.98 million vehicle hours of delay statewide (11.3 million in the Baltimore region), 5.06 million gallons of fuel, and reduced overall mobile source emissions, particularly CO emissions.

The mission of the Maryland CHART program is to improve the mobility and safety of highway users through the application of ITS technology and inter-agency teamwork. Its goals are to: (1) improve highway safety and efficiency by rapidly detecting and responding to hazardous highway conditions using traffic and roadway monitoring strategies; (2) quickly and efficiently restore normal traffic flow after incidents using incident management strategies; (3) provide timely and reliable mobility information to the traveling public through its traveler information systems; (4) reduce congestion on highways by employing traffic management strategies; and (5) expand the CHART operating system and communications network to support sharing of transportation information, and inter-modal and inter-agency coordination and connectivity.

To achieve its mission and goals, CHART has installed various ITS technologies, such as closed circuit television cameras, dynamic message signs, traffic speed detectors, roadway weather information systems and highway advisory radio on the interstate highways in the Baltimore region and other parts of the state using a combination of federal and state funds. CHART also provides roving rapid response teams (emergency traffic patrols) that provide assistance to disabled motorists, assist in clearing incidents from travel lanes, and reroute traffic around incidents.

Efforts are continuing by the SHA to improve traffic flow, mitigate congestion, and reduce mobile source emissions in major travel corridors and at critical intersections throughout the region. These ongoing efforts include traffic signal systemization projects, roundabout construction, bus-activated signal preemption projects, intersection reconstruction, park-and-ride facility construction, improved fixed message and variable message signage, and other traffic management projects implemented in conjunction with the continuing CHART program.

E.2. Electronic Toll Collection

The Maryland Transportation Authority commenced operation of its electronic toll collection system, M-TAG, at the authority's three harbor crossing facilities in 1999. By fall 2001, all toll facilities in the region were equipped with electronic toll collection equipment. As of January 2004, 45 percent of vehicles using MdTA facilities used electronic toll tags.

MdTA is a member of the E-Z Pass InterAgency Group, a coalition of Northeast Toll Authorities. MdTA established reciprocity with the E-Z Pass system in 2001, enabling travelers in Maryland, as well as at most toll facilities in New York, New Jersey, Delaware, Pennsylvania, Massachusetts, Virginia, and West Virginia to pay tolls using one electronic device.

E.3. Traffic Signal System Retiming

SHA has instituted a statewide program to review and retime its 1,200 traffic signals in 200 signal systems. The timing of each traffic signal system is reviewed and updated every three years. In addition, systems in high profile corridors or corridors subject to significant traffic pattern change are evaluated on a more frequent schedule. This program results in smoother traffic flow as well as reduced emissions resulting from idling vehicles. *Synchro* software is used to develop new timing plans and to calculate benefits from the new timing plans. This program has resulted in the following average annual benefits for the Baltimore region: 11.8 percent reduction in network delay; 8.5 percent reduction in arterial delay; 8.7 percent reduction in arterial stops; and 1.9 percent reduction in fuel consumption.

E.4. Multi-Modal Traveler Information System

Efforts are also underway to develop a Multi-Modal Traveler Information System for the region. Providing multi-modal information to travelers will enable them to make more informed travel decisions, such as what route to take, what mode to take, when to leave, or even whether to make the trip at all. This information will enable travelers to reduce travel time delays and stabilize travel speeds, both of which will reduce mobile source emissions. A public-private partnership to complete this project was agreed to by MDOT and the Maryland Board of Public Works in September 2004. Region-wide availability of the traveler information system is expected by the end of 2006.

E.5 Baltimore Regional Operations Coordination Committee

Launched in September 2000, the Baltimore Regional Operations Coordination Committee has worked to improve coordination of incident management activities to reduce traffic congestion and delay, enhance the safety of the traveling public, and improve the quality of the environment. Participants on the B-ROC Committee include police, fire, and transportation agencies from the jurisdictions, MDOT and its modal administrations, Maryland State Police, MDE, FHWA, National Park Service Police, Maryland Medical Examiner's office, and others. Since the inception of the B-ROC Committee, various projects have been undertaken to improve responder coordination, cooperation, and communication which leads to incidents being cleared more quickly and safely.

F. BICYCLE/PEDESTRIAN ACTIVITIES

Through MDOT, SHA has worked to engineer and implement new and improved bicycle and pedestrian facilities. While fund-source programs such as the Bike Retrofit, Sidewalk Retrofit and Smart Growth Transit Program have been eliminated or zeroed out, SHA continues to work toward improving and expanding the network of bicycle and pedestrian facilities. An example of such an effort includes a recent improvement effort on Harford Road in Parkville, Baltimore County. The roadway section was reconfigured to include striped bicycle lanes through a central business district in an effort to provide routine accommodation. SHA has a stated goal of providing 200 miles of marked bicycle lanes throughout Maryland by December 31, 2006.

In the region, the BRTB continues to provide a foundation for bicycle and pedestrian facility implementation. For example, BMC undertook a detailed analysis of the advanced bicycle stop bar pavement marking treatment. BMC undertook this research at the request of the Baltimore City Department of Transportation; the DOT sought to provide a safe entrance to the City from points south via the Potee Street Bridge.

In each jurisdiction, efforts continue to accommodate bicycles and pedestrians. With $5000 donated by the Baltimore Bicycle Club and earmarked for installation of bicycle rack in Baltimore, Baltimore City DPW began installation of inverted U racks across the city in 2003/2004. Locations were chosen by a cooperative composed of the City, the Mayors Bicycle Committee (on which the BRTB is represented) and BBC. Locations include transportation hubs such as Penn Station, as well as recreational/cultural destinations such as the Patterson Theatre. Almost all installation activities were completed in 2004.

Howard County continues to utilize the results of a recent GIS inventory of transit facilities to undertake improvements to provide pedestrian access to across the county. Construction has been completed in several locations, while additional activities are planned and/or underway.

G. PREFERENTIAL PARKING MANAGEMENT

Parking management is an important strategy for managing transportation demand and a complementary action to increase the effectiveness of the various rideshare programs. This strategy assumes several forms, with preferential parking management being the most basic.

Preferential parking for carpools/vanpools is a traditional ERS in the Baltimore region. Carpoolers receive the most desirable parking spaces, usually those nearest to the building or in protective garages.

H. CLEAN AND EFFICIENT STRATEGIES

In Fall 2003, MDE received a grant from EPA to convert one of MTA's facilities from regular diesel to ultra-low sulfur diesel, thereby reducing emissions from approximately 165 buses. The project also allows the State to test other emissions-reducing technologies and test the effects of the low-sulfur diesel before it is required for use in 2006.

MDE is also working with Baltimore City to retrofit some heavy-duty vehicles such as trash haulers and school buses with diesel oxidation catalysts to help reduce emissions.

In early 2005, MDE received a Clean Diesel Campaign grant from EPA to retrofit ambulances and fire trucks. This project involves a partnership between MDE and the Baltimore City Fire Department. The grant will allow for the installation of diesel oxidation catalysts and crankcase ventilation filtration systems.

Also in early 2005, BMC received a grant from the Maryland Energy Administration for the demonstration of hybrid bus technologies to local transit operators. BMC arranged a tour of several hybrid buses to transit providers in the region. Providers were given an opportunity to evaluate the vehicles under actual operating conditions. Findings from this demonstration will be published in a report in late 2005. It is hoped that the project will encourage transit providers to purchase hybrids as they replace aging components of their fleets.

I. EPISODIC CONTROL PROGRAMS — CLEAN AIR PARTNERS PROGRAM

The Clean Air Partners program is a public/private partnership working to improve air quality in both the Baltimore and Washington regions by motivating individuals to take voluntary actions that reduce emissions. BMC, in cooperation with MDE, MDOT, and numerous other public and private sector entities, works with area employers to develop voluntary programs to reduce both operational and employee related emissions. Each participating organization develops an Air Quality Action Days, formerly Ozone Action Days, plan. At the basic level, plans include public education while the more ambitious plans may take costly actions to reduce emissions such as shutting down incinerators. Organizations put their plans into action on days of the year when air quality is expected to exceed the EPA health standards.

In 2005, Clean Air Partners conducted dozens of outreach events throughout the Baltimore/Washington regions. These events included on-site visits to large employers, schools, and appearances at community events. Clean Air Partners conducted a media campaign in both the Baltimore and Washington markets, which included drive-time radio spots. Clean Air Partners staff members conducted press interviews in both Baltimore and Washington. The Partnership has worked hard to nurture a relationship with the media in both markets. This effort has paid off with accurate and positive press coverage, raising awareness of both the problem and the Clean Air Partners partnership.

The partners produced updated educational materials including new information on PM2.5 as well as ground-level ozone, improved its website, **cleanairpartners.net**, and worked to upgrade the Air Quality

Action Days Program, by providing training and better communication with the over 400 AQAD participants in the Baltimore/Washington air shed. Clean Air Partners has also worked with MDE, Metropolitan Washington Council of Governments, and BMC on improving air quality forecasting, as well as the communication of those forecasts.

Clean Air Partners continues to be a major sponsor of BMC's annual Clean Commute Month initiative. Held each May, Clean Commute Month activities raise awareness of the relationship between transportation choices and air quality and promote alternatives to single occupant vehicles.

IV. CONCLUSIONS

The BRTB conducted a comprehensive analysis of conformity of the Plan and TIP for the Baltimore region, for fine particulate matter (PM2.5). This conformity analysis was conducted through a quantitative and qualitative review of the projects in the Plan and TIP. The conformity determination process ensures that long-range transportation plans and short-term programs contribute to air quality improvement objectives delineated in the State Implementation Plan. Because there is currently no SIP for PM2.5, for the Baltimore region, an interim emissions test was used to determine conformity. In determining PM2.5 conformity using the interim emissions test, MPO officials estimate the future PM2.5 emissions produced by the planned transportation system. These emission projections are then compared with 2002 baseline year emission levels to determine whether the Plan and TIP are, or are not, in conformity. If PM2.5 emissions levels in applicable horizon years are no greater than PM2.5 emissions levels in the 2002 baseline year, then the Plan and TIP are in conformity for the PM2.5 standard.

The technical analysis of the Plan and TIP involved computer model applications to forecast the emissions of direct PM2.5 and NO_x associated with the implementation scenarios of these planning analyses. A determination of conformity with an interim emissions test was made based upon MOBILE6.2 model results and reductions provided from the application of off-model analyses for various emission reduction strategies.

> *Based on the quantitative assessment of the Plan and TIP displayed in Section II, it has been determined that the project elements and programmatic strategies of the Plan and TIP meet the goal of conformity determination. Emissions associated with these projects and initiatives pass the interim emissions test required by §93.109 (i)(2) of the Final Transportation Conformity Rule Amendments of July 1, 2004 under the 2010, 2020 and 2030 implementation scenarios for the Plan and TIP.*